THE IRON AGE

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 82: No. 23. *New York, Thursday, December 3, 1908.*

$5.00 a Year, including Postage. Single Copies, 15 Cents.

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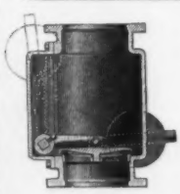
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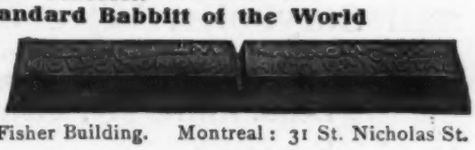
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THE IRON AGE

New York, Thursday, December 3, 1908.

The Steel Car Plant of the Bettendorf Axle Company.

The expansion of the Bettendorf Axle Company's operations in the past few years has involved important construction at Bettendorf, a suburb of Davenport, Iowa. Here the company has 70 acres of land which is being rapidly utilized for manufacturing purposes, the building of steel freight cars having been begun this year. Steel car construction calls for the handling of a large tonnage each day of various forms of steel, and a modern plant like that at Bettendorf involves the provision of plenty of room for the placing of bulky parts while in process and pending their assembling, while at the same time there must be the closest connection between each department and the one involving the next operation, so that no time be lost in the progress of material toward the final product. A feature of the Bettendorf plant which deserves particular mention is the unusual outfit of hydraulic presses, more than 60 being in use, varying in capacity from 50 tons to 1800 tons. An idea of the power developed is obtained from the statement that in the largest of these presses 24-in. I beams are shaped cold, the ends being reduced and the beams otherwise shaped besides being punched in various places. All the smaller car parts except castings are shaped and prepared for use in the same way. The special hydraulic machinery was designed and built by the company.

Fig. 1.—Main Bay of Bettendorf Axle Company's Steel Car Works.—Assembling and Finishing Department.

The main shop, of which a view in the main bay is given in Fig. 1 is 240 x 700 ft. Its relation to the auxiliary buildings and to the complete track system is shown in the plan view, Fig. 2, which takes in a stretch of about one-quarter mile from east to west. As the progress of material is from east to west, or from right to left in the ground plan, the hydraulic presses are located in the east end where bolster and car parts are shaped and punched. The car and bolster riveting department are in the west end of the shop. Castings are brought from the storehouse on the south into the center of the main shop where they are riveted to the steel bolster and car parts. In the west end the body and truck bolsters, steel under frames and all steel cars are assembled, painted and shipped. In the main bay, where steel cars are assembled and finished, the heavy parts are handled by overhead cranes. There are six of these, ranging from 5 to 15 tons capacity.

Fig. 3 shows a line of mounted wheels in the assembling department with a pile of Bettendorf cast steel side frames at the right. The parts of the track, including bolsters, brake beams, springs, wedges and brasses, are placed at intervals along the track within easy reach of the assemblers. A pair of mounted wheels is run upon a track elevated sufficiently to make handling most convenient for the workmen and one side frame is put in position. The wedges and brasses are then inserted in the journal boxes and the truck bolster set in place. Then the second side frame, together with its brasses and wedges, is added. Next the bolster is raised up against the top arch bar and the spring plank and springs are slipped into position. Then after the brake beam is hung and the brake rigging attached, the truck is completely assembled and ready to be placed under a car. It requires about 8 min. to assemble this truck and 9 min. to dismantle it after it has been placed under a car. Figs. 4 and 5 show assembled trucks with cast steel side frames having journal boxes cast integral. Aside from dispensing with the numerous bolts and nuts used in the arch bar truck a considerable decrease in weight is secured by this design. The arrangements for assembling have proved excellently adapted to the requirements; in several particulars the plant is unique in the economies thus provided.

Representing the exceptional equipment of hydraulic machinery, Figs. 6 and 7 are interesting. In the former one of the largest hydraulic presses in the shop is shown. It has a capacity of 1500 tons and is used exclusively for punching and shaping large 24-in. I beam center sills and side sheets and for shearing and shaping steel gondola drop bottoms and other portions of steel cars. Punching

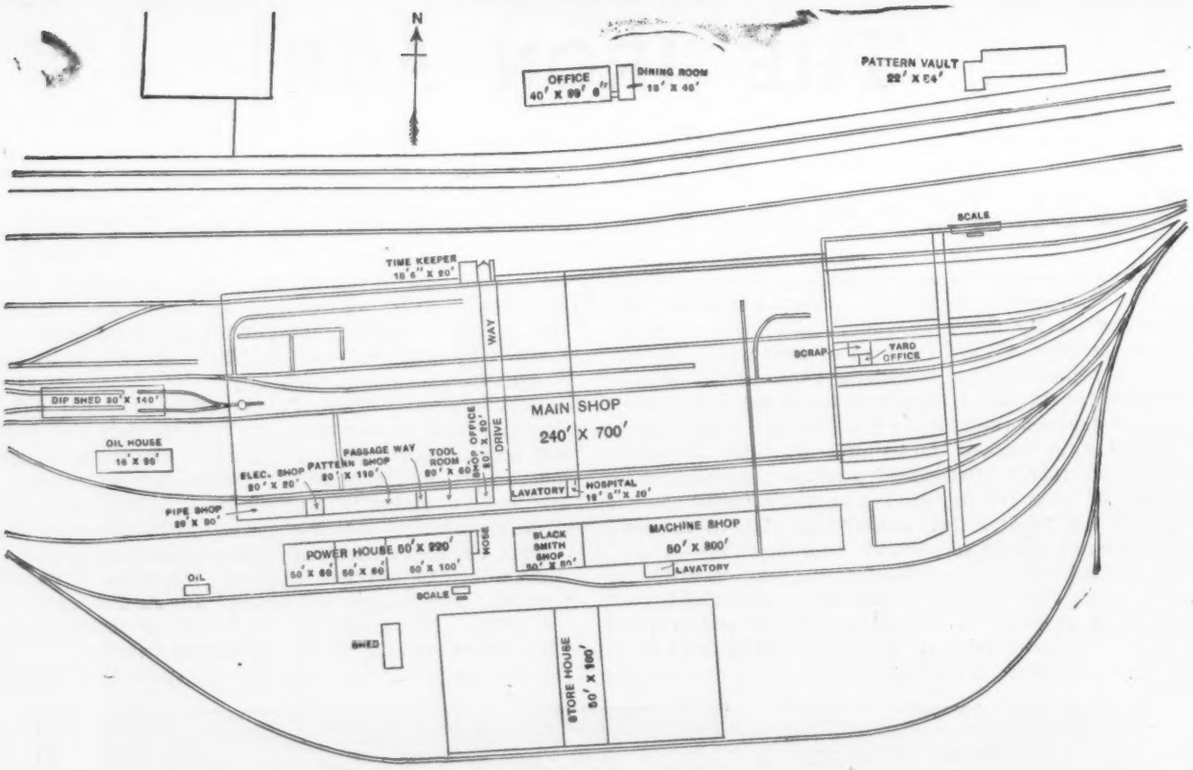


Fig. 2.—Plan of Main Shop and Auxiliary Plant at Bettendorf.

and shaping are done at one operation. The view of the main bolster department, Fig. 7, shows at the left four hydraulic presses of 1200 tons capacity, used for punching, squaring and shaping the I beams and plates used in the construction of the Bettendorf I beam bolsters. Assembling, riveting and inspection in the bolster department are represented in Fig. 8.

In addition to the hydraulic machinery the plant is well equipped with machines operated by electricity or compressed air. There are 11 electric traveling cranes, furnished by Pawling & Harnischfeger, Milwaukee, Wis., and the Cleveland Crane & Car Company, Wickliffe, Ohio. Much of the riveting, particularly of sheets, is done by compressed air, which is also made use of in the chipping

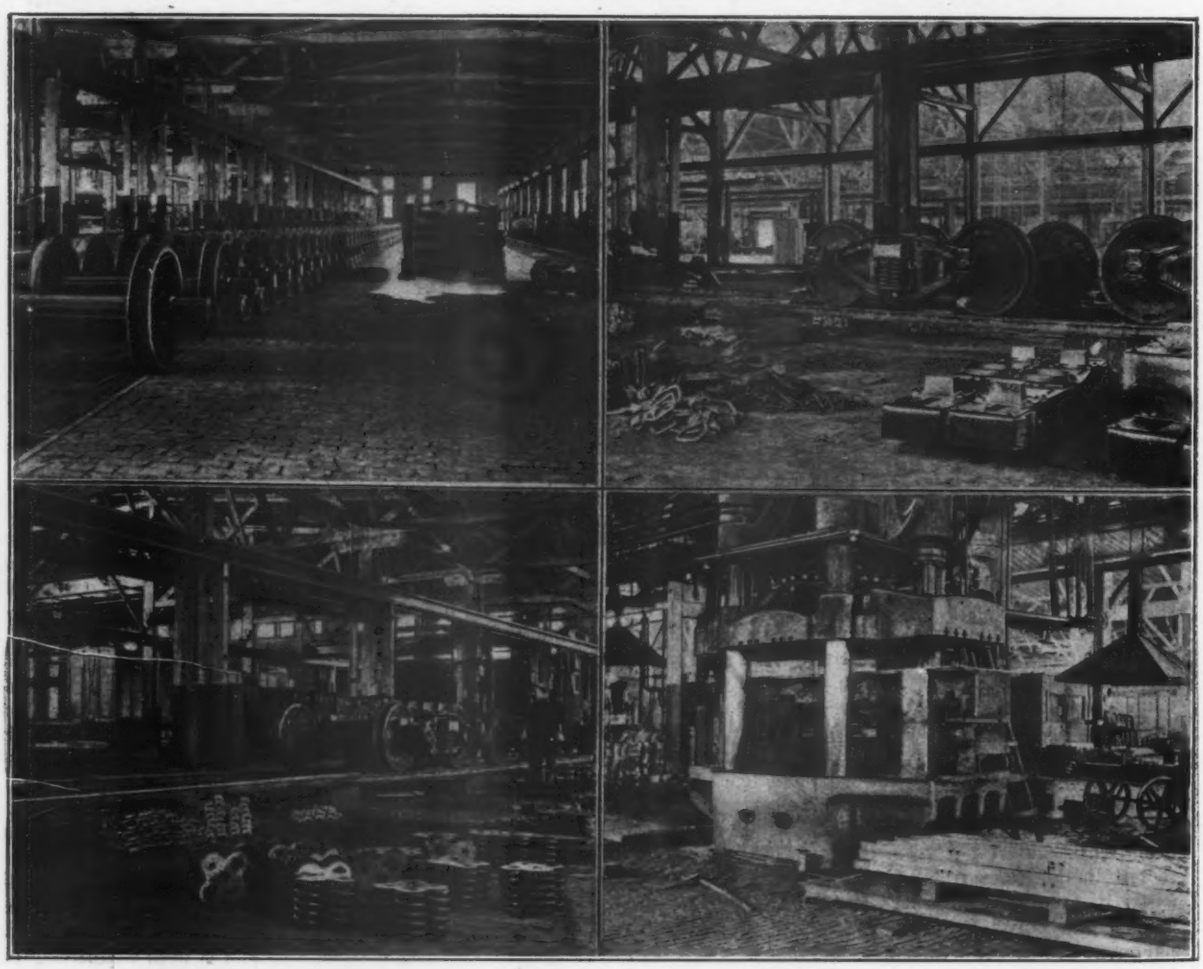


Fig. 3.—Mounted Wheels in Assembling Department.—Cast Steel Side Frames at the Right.

Fig. 5.—Another View in Assembling Department, Showing Elevation of Track.

Fig. 4.—Assembled Trucks with Steel Side Frames, Journal Boxes Being Cast Integral.

Fig. 6.—1500-Ton Hydraulic Press.

and finishing of castings. Air is used for the sand blast employed to clean sheets, plates and other parts preparatory to painting. There is a complete electric light plant which supplies light for the shops and offices.

The machine shop was at first in the power building, but the space proved quite inadequate. A large new machine shop was finished this year, standing east of the power house and south of the main shop. The building is 50 x 380 ft., the machine shop occupying 300 ft. of the length, while 80 ft. at the west end is utilized for the blacksmith shop.

The power house is 80 x 220 ft. Six horizontal boilers with an aggregate capacity of about 1000 hp. are in the west end of the building, and the engine room adjoining contains the pumps and machinery.

South of the power house and machine shop are extensive storehouses for material, and to the west are the paint shop and other minor buildings in a group by themselves. The Davenport, Rock Island & Northwestern, the Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy Railroads run through the manufacturing tract, and excellent switching and yard facilities, including four tracks running through the main buildings, have been obtained. Locomotive cranes are used for loading and unloading materials in the yards and shops.

Beginning about 10 years ago with the manufacture of I beam bolsters in its old Davenport plant, the Bettendorf Axle Company has added successively the Bettendorf steel car underframe, the cast steel truck with integral journal boxes and finally complete tank and freight cars. Of the bolsters there are now over 500,000 in service and the car truck with the one-piece frame has been making rapid progress. Tank cars of the Bettendorf type have been furnished to 40 private car lines. Recently an order for 1000 gondola cars was completed for the Chicago, Burlington & Quincy and for some time an order for 2500 steel underframes for the St. Paul has been going through the works at the rate of 25 a day. The plant has a daily capacity of 25 complete cars or 40 steel under frames.

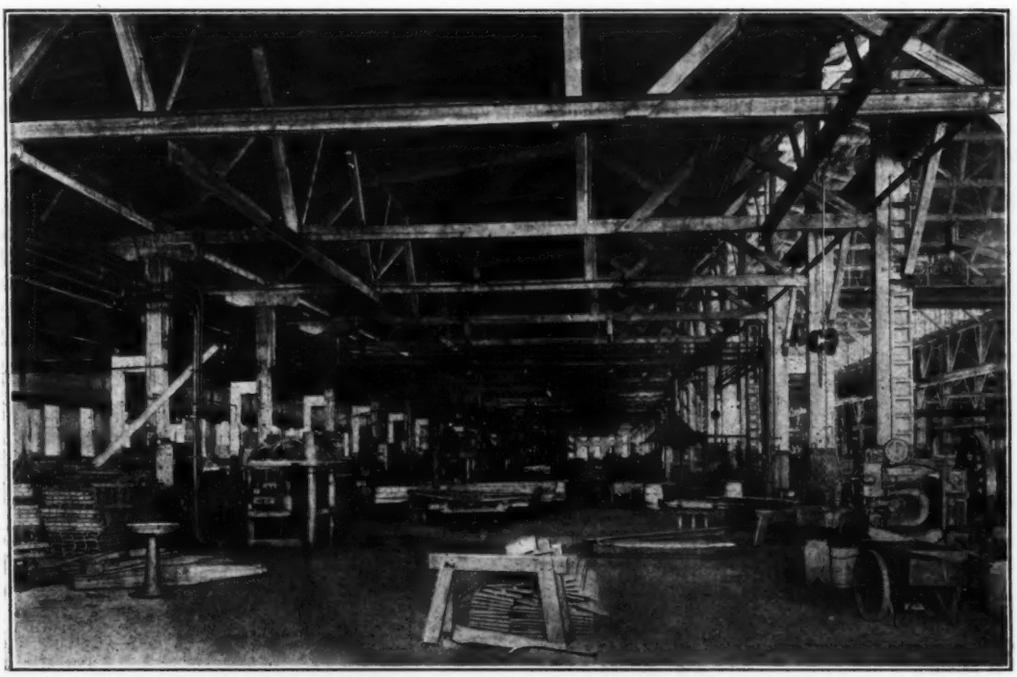


Fig. 7.—View of Main Bolster Department, Showing Presses Used for Punching and Shaping Beams and Plates.

Fig. 8.—Portion of Bolster Department Devoted to Assembling, Riveting and Inspection.

Efficiency Tests of Milling Machines and Milling Cutters.*

BY A. L. DE LEEUW, CINCINNATI, OHIO.

When the author conducted the speed and feed tests of milling machines herein described at the works of the Cincinnati Milling Machine Company the main points to be settled were: How much metal shall a machine of given size be capable of removing? How much power is required for this work on existing machines? Is it possible to improve on the efficiency of present machines and still produce a commercially successful machine? How much power is required for the feed? What is the efficiency of the feed mechanism? The first question is largely a matter of competition. Usually in the design of a new line of machines the desired capacity is placed somewhat higher than that of other makes of similar machines. The customary method is to increase the size

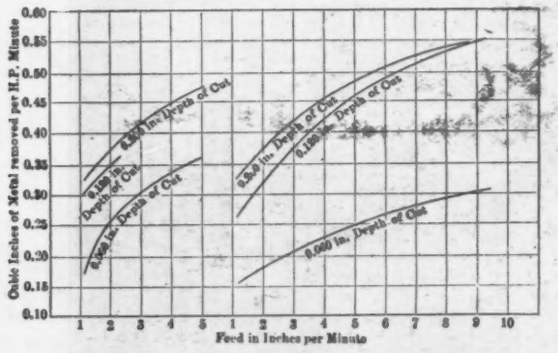

Cubic Inches of Metal removed per H.P. Minute
Feed in Inches per Minute
0.150 in. Depth of Cut
0.300 in. Depth of Cut
0.600 in. Depth of Cut

Fig. 1.—Cutting Speed 12 Ft. Per Minute. Fig. 2.—Cutting Speed 32 Ft. Per Minute.
Work of 1 Hp. Min. Measured in Cubic Inches of Metal Removed, Feed Increasing.

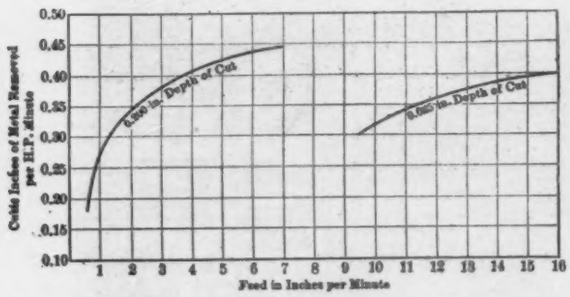


Fig. 3.—Work of 1 Hp. Min. Measured in Cubic Inches of Metal Removed, Cutting Speed 45 Ft. Per Minute, Feed Increasing.

of driving pulleys or belt, or the gear ratio, or any combination of these elements. This is not advisable, for two reasons. There is nothing to prevent competitors from going still further and so securing a seeming advantage in the sale of their machines without sacrificing anything but a few pounds of cast iron, and the purchaser of the machine is not interested in the amount of power which he can feed into the machine, but in the power of the spindle end. It is better if he can take a given cut with less power, for the power saved would otherwise be used to wear or destroy the machine.

To determine how much power was required to remove a given amount of metal, tests were made on various machines. The metal to be cut was in all cases, both in these tests and in those to be described later, steel of the following specifications:

Combined carbon	0.16 per cent.
Silicon	0.008 per cent.
Manganese	0.51 per cent.
Phosphorus	0.086 per cent.
Sulphur	0.041 per cent.
Tensile strength per square inch	52,378 lb.
Limit of elasticity	30,313
Elongation, per cent. of length	50 per cent.
Per cent. reduction of area	54 per cent.

* Abstract of a paper printed in the November *Journal* of the American Society of Mechanical Engineers and to be presented at the New York meeting, December 3, 1908.

The test blocks were 18 x 5½ x 5½ in., with the ends milled in to provide for holding the block on the table of the milling machine. In all tests a high speed steel spiral cutter with nicked teeth was used, 3½ in. in diameter, 6 in. face. The driving was by an electric motor, belted to the machine. All conditions were as near as possible those under which most milling machines have to run. The power consumed was ascertained by reading an ammeter and a voltmeter, and the metal removed by measuring width and depth of cut and the feed per minute. The amount of feed, as indicated on the index plate of a milling machine, is an approximation, not close enough for a test. The actual amount of feed was therefore computed from the gearing. If the feed is expressed in thousands of an inch per revolution, the feed per minute depends on the spindle speed. The exact number of revolutions of the spindle at normal motor speed was determined by computing the gear ratio and pulley ratio. The speed of the first driving shaft of the machine was determined by a tachometer. All readings were taken simultaneously. The spindle

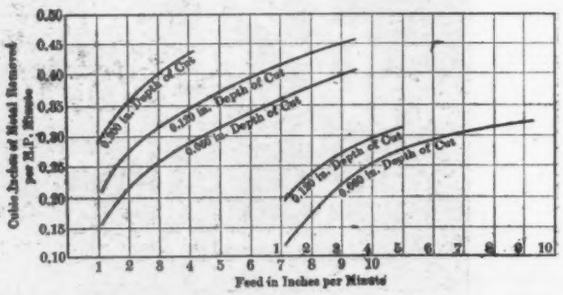

Cubic Inches of Metal Removed per H.P. Minute
Feed in Inches per Minute
0.150 in. Depth of Cut
0.300 in. Depth of Cut
0.600 in. Depth of Cut

Fig. 4.—Cutting Speed 67 Ft. Per Minute. Fig. 5.—Cutting Speed 150 Ft. Per Minute.
Work of 1 Hp. Min. Measured in Cubic Inches of Metal Removed, Feed Increasing.

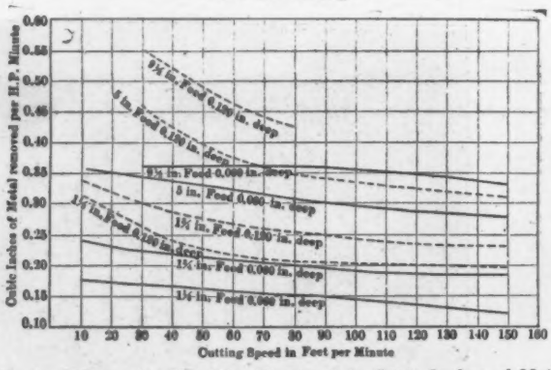

Cubic Inches of Metal removed per H.P. Minute
Cutting Speed in Feet per Minute
9¼ in. Feed 0.150 in. deep
5 in. Feed 0.150 in. deep
9½ in. Feed 0.000 in. deep
5 in. Feed 0.000 in. deep
1½ in. Feed 0.150 in. deep
1½ in. Feed 0.000 in. deep
1¼ in. Feed 0.000 in. deep

Fig. 6.—Work of 1 Hp. Min. Measured in Cubic Inches of Metal Removed, Cutting Speed Increasing.

speed and the feed per minute were corrected according to the tachometer reading. Where the feed of the machine was independent of the spindle speed—that is, taken from a constant speed shaft and therefore expressed in inches per minute—the same correction was made, as the amount of feed and therefore the amount of metal removed was again a function of the speed of the first driving shaft.

These preliminary tests showed considerable differences in the efficiency of different machines; one would cut considerably more material than another for a given horsepower supplied by the motor. They also showed that the efficiency of all machines was relatively low as compared to a lathe. As the main problem in a machine shop is not to save power, but to get the greatest possible output, this lack of efficiency cannot be held against the milling machine as a type, for its other peculiarities make it highly efficient as a producer of work. The fact that one machine is so much more efficient than another is of great importance, however. It shows that the less efficient machines use a needlessly large amount of power, have less capacity than they might have for removing metal, and use a large amount of power constantly for the purpose of breaking down the machine.

More complete tests were made after a line of high power millers based on the results of the preliminary

tests was developed and completed. These tests were of three kinds—determining the amount of metal removed per horsepower, the efficiency of the feed mechanism and the efficiency of the driving mechanism.

Power Required to Remove Metal.

The same motor and belt were used for all cutting tests. Series of tests were made with a 1-16-in. depth of cut, ⅛, 3-16, ¼ and ⅜ in. Each complete test was repeated four times. The cutter was sharpened in the ordinary way before starting a complete series, and not resharpened during test. The same cutter, resharpened, was then used for the next machine. For each depth of cut a number of different feeds were used, every alternate one from the next to the lowest up to the highest. It was impossible to go through the entire series with the deeper cuts, as the belt would slip before the last feed was reached. Readings were taken, when the belt slipped, but these readings were not used in plotting curves. They served as a check on the belt tension. It was found that the ammeter readings gradually increased from the first to the fourth series. This was probably due to the gradual dulling of the cutter.

In plotting the curves, the test readings were first corrected; the power readings by means of the efficiency chart of the motor; the amount of metal for loss of speed of the machine. The curve as plotted is the curve of the average value of powers. Where the curve shows an amount of metal removed of, say, 5½ cu. in. per minute, this amount may be due to 1-16-in. depth of cut and a 16-in. feed, ⅛-in. depth of cut and 8-in. feed, or ¼-in. depth of cut and 4-in. feed. The power required to remove a given amount of metal varied with the speed, depth of cut and feed per minute, and seems to have a tendency to the minimum when the section of the chip removed per tooth approaches most nearly a perfect square. Figs. 1, 2, 3, 4, 5 and 6 show curves giving relation between power required and metal removed under different conditions of speed, feed and depth of cut. They are partly derived from the tests described, and partly from tests made for the special purpose of ascertaining these relations. The fact that the power required changes with these conditions of feed, speed and depth of cut made it impossible to plot a single curve giving relation between power and metal removed. Besides, the same speeds and feeds obtainable on one machine were not obtainable on another. And again, the amount of slippage or slowing down of the machine was not always the same for the same amount of metal removed. For this reason the averages have been plotted, and these averages were obtainable for the various machines in substantially the same manner. The curves were extended to the zero point, but the high point of all curves is the actual highest average obtained, so that the curves also compare maximum capacities of these machines. This should be taken as significant, however, only when remembering the conditions under which the machines were tested, and then only as a measure for the maximum driving power.

Power Required for Feed Mechanism.

Tests made by the Cincinnati Milling Machine Company and other milling machine manufacturers had shown that considerable power is required for the feed drive of a column and knee type of machine. As much as 40 per cent. of the total power applied might be used for the feed alone, and this could amount to as much as 3½ hp. on a No. 4 machine.

To determine the efficiency of the feed mechanism the power used was measured, as well as the work done by the table. As the power required varied widely, and it would be impossible, therefore, to obtain an efficiency chart for some small motor covering the entire range of powers used, the idea of using an individual motor for the feed alone was abandoned. Instead, the same motor was used as had been used for other tests. The efficiency of this motor was not known below one-quarter load. It was then necessary to provide an artificial and constant load for the motor. For this purpose the square box shown in Fig. 7 was mounted on the spindle arbor. It had a paddle inside and a number of obstructions which made the required resistance for the water in the box. By varying the water in the box and the paddle speed any load could be produced within the range of the apparatus, and this load was constant. The box was kept from rotating by the over arm of the machine. The dead load was adjusted until it came within the efficiency curve of the motor. The part of the apparatus used for measuring the work done by the table consisted of a dynamometer, graduated and calibrated up to 8000 lb.

One end of this dynamometer was attached to the table of the milling machine. A chain at the other end was wrapped around a drum mounted on a Weston type

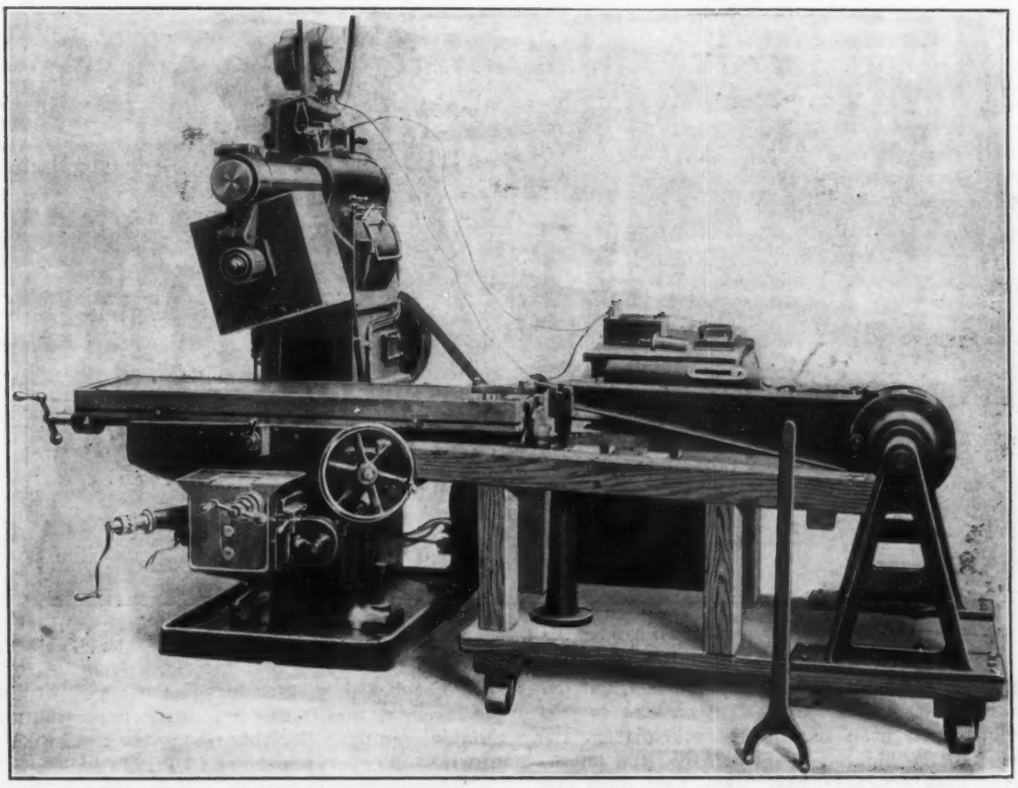


Fig. 7.—Apparatus for Testing the Feed Efficiency of a Milling Machine.

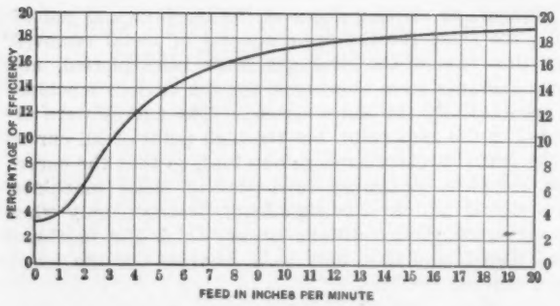


Fig. 8.—Feed Efficiency Curve for a No. 4 Plain Miller.

brake. An arm, mounted on the brake casing and visible in the drawing, had been used to determine the efficiency of the driving mechanism, but was not used in this experiment, except to form an abutment for the brake. The brake itself was used only as a safety device, being set at sufficient pressure for the test, but not enough to wreck the machine. The test was carried out as follows: All even feeds were taken from the second lowest to the highest. For each feed the following pressures were selected: 1000, 2000, 3000, 4500 and 6000 lb. The entire series was repeated once. If something happened to disturb the proceedings, or if something had to be readjusted, the test was dropped and no curve was plotted until two complete series of tests were made without interruption. A sensitive ammeter reading 1-10 amperes was used. The tachometer served again to take the speed of the first driving shaft, and all corrections were made as in the previous test. With a given feed an entire series of pressures was gone through, after which the amount of feed was changed for the new series, &c.

Before and after each series of readings at the different pressures used for a single feed, the feed mechanism was disconnected to get the reading of the dead load. One observer read the tachometer; another the ammeter; a third the dynamometer, and a fourth was stationed at the feed starting lever. The dynamometer observer would call out sharply when the pointer reached the proper figure. At this moment all readings were taken and the feed disconnected. It was found easy to duplicate the readings in this fashion. The rise in the ammeter readings was gradual, and allowed the observer to take the correct reading every time within 0.1 ampere. Any drop in the speed of the machine was also very gradual, permitting the tachometer readings to be easily duplicated. The only point not so easily duplicated was the reading of the dynamometer, especially at the faster feeds. It often happened that the feed pressure would go somewhat beyond the pressure intended, but the dynamometer did not change its position when the feed was thrown out, so that the observer could take his reading at leisure. Fig. 8 shows the curve of average values plotted from the readings of the test on a No. 4 plain miller. Each ordinate is the average of the ordinates corresponding to a certain amount of feed.

Tests Upon Efficiency of Driving Mechanism.

The third series of tests relates to the efficiency of milling machines as power transmitting devices—that is, the ratio of input and output of power. Some preliminary tests were made by observing the power at the spindle by means of a Weston type brake, the one illustrated in Fig. 7. This gave fairly good results at the higher speeds, the torque being small; but at the lower speeds and with greater torque the action of the brake became jerky and it was practically impossible to obtain reliable readings. For this reason the tests were carried on with the apparatus shown in Fig. 9.

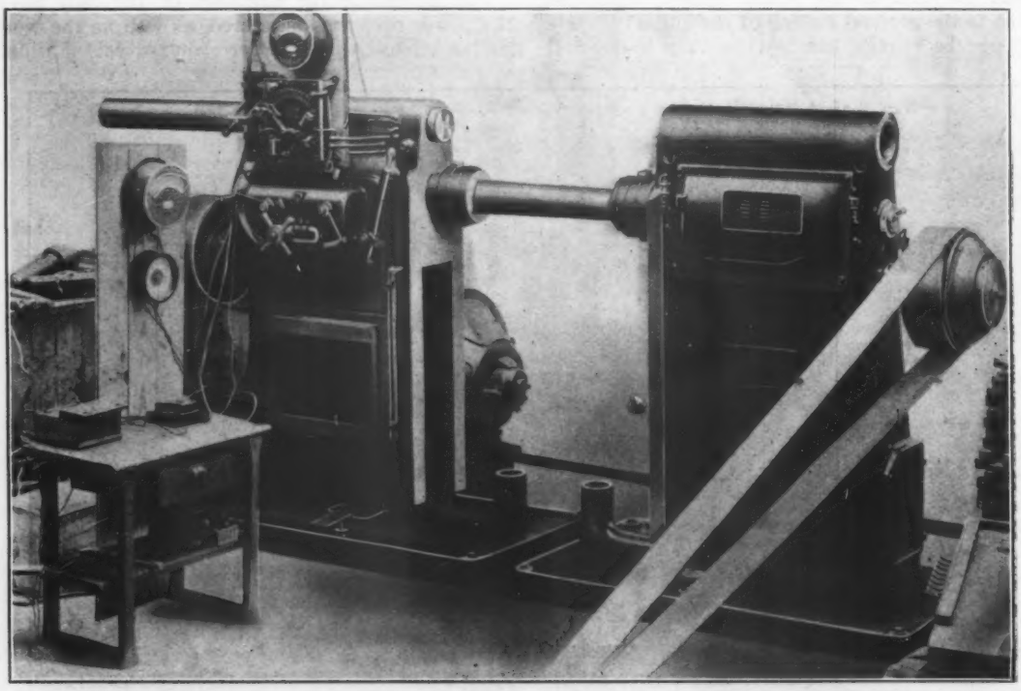


Fig. 9.—Apparatus for Testing the Efficiency of Milling Machine Drives.

This consisted of two No. 4 high power millers, placed opposite each other and connected by a stout shaft. The feed works, knee, saddle and table were removed, leaving the bare frames and driving works. The machines were placed with the spindles approximately in line. A flange was screwed to the nose of each spindle; each flange was provided with a tongue engaging the groove in the similar flange opposing it, and keyed to the connecting shaft. There was plenty of clearance between tongue and groove and also endwise, so that the connec-

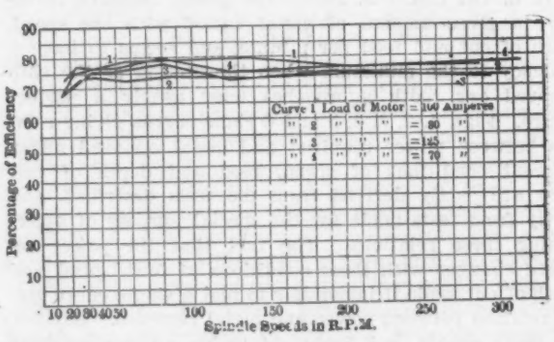


Fig. 10.—Efficiency Curves of a No. 4 Cincinnati High Power Miller.

tion could behave as a universal joint shaft if the spindles were not exactly in line. Flat pieces of steel bolted to the one flange prevented the connection from coming apart. One of the machines was driven by a motor, while the other drove a generator. The current thus generated was dissipated in a water rheostat, by which the current could be closely regulated. There was a set of electric instruments for motor and generator each, so that all readings could be taken simultaneously. Both machines were driven by belts. A tachometer was used to determine if one of the belts slipped excessively.

The speed controlling levers of both machines were always set for the same speed, so that both driving pulleys were always running at the same speed. Different sets of readings were taken. In one set the current consumed was kept at as near 125 amperes as possible; in another at 100 amperes; in another, 80, and in the fourth, 70. Each set of tests was carried out over a number of speeds—namely, the lowest, third, fifth, &c., up to the highest but one. After correcting for motor and generator efficiency, the quotient of the corrected

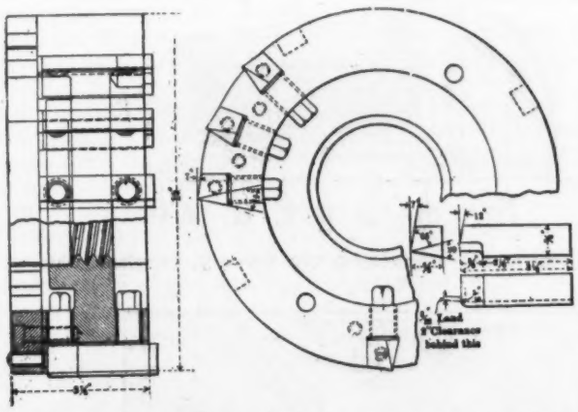


Fig. 11.—Details of a 10-In. 16-Blade Cutter Used in the Tests.

readings gives the product of the efficiencies of the two machines. It would be proper to consider the two machines as of equal efficiency if the conditions of load were the same, for these tests did not attempt to establish the efficiency of an individual machine, but of a type of machines; but the conditions of the load were not the same for both machines. The load was the same only at the spindle noses. From there on and up to the driving pulley the load increased in the first and diminished in the second machine. The efficiency of the first machine is made up of the efficiencies of its bearings, shafts, sets of mating gears, &c. These efficiencies may be called e 1, e 2, e 3, &c. The total efficiency of the first machine being E, then $E = e\,1 \times e\,2 \times e\,3$, &c. Similarly, taking F as the symbol of the efficiency of the second machine, then $F = f\,1 \times f\,2 \times f\,3$, &c. The f's may be assumed to differ from the e's on account of the difference in load. It was found, however, on taking the readings that there was such a small difference in efficiency, whatever the load, that it seems to be allowable to consider the efficiency as practically constant, in which case the efficiency of each machine equals the square root of output divided by input. The curves presented in Fig. 10 are based on this assumption. It will be seen that the efficiency of the machine varies from 67 up to 79.7. Various tests made at other times have shown repeatedly efficiencies above those plotted in the curves.

Efficiency of Cutters of Different Types.

The milling machine is not essentially less efficient as a power transmitter than any other machine tool, but the amount of metal removed per horsepower per minute is low; much lower, in fact, than for the lathe or planer. Were it not for other properties the milling machine could not compete with either of these two machines. Still the milling machine would be esteemed higher if its power consumption could be brought down to the level of the lathe. It is obvious that this cannot be done by increasing the efficiency of the mechanism, as the margin is not enough to allow of any material improvement. Any substantial increase of efficiency must be found in improvements of the cutting tool. With this in mind, tests were made of the power required to remove a given amount of metal with different styles of cutters. These tests have not been carried out over a long enough period or with a large enough variety of cutters to give absolutely reliable results; yet, incomplete as they were, they bring out in a startling way the amount of improvement that may be made in this direction.

Cuts made with a spiral cutter with nicked teeth showed a best efficiency of 0.48 cu. in. of metal per net horsepower per minute, and this efficiency was obtained only in a few isolated cuts and with a very sharp cutter. Cuts made with a 14-in. face cutter with inserted teeth and on a No. 4 Cincinnati high power miller showed a production of 0.64 cu. in. per net horsepower per minute, an increase of 33 1-3 per cent. over the spiral cutter. This result confirms the general belief that a face cutter cuts freer than a spiral cutter. The teeth of this face cutter were radial, as it is customary to make them. Tests made with the cutter shown in Fig. 11 showed an efficiency of 0.96 cu. in. of metal per net horsepower per minute, and a few isolated cuts even higher. This is an improvement of 100 per cent. over the spiral cutter and 50 per cent. over the face cutter with radial teeth. The cutter shown in Fig. 12 showed the same efficiency. Both cutters have the blade set tangent to a circle concentric with the cutter, thus giving them a rake angle of 15 degrees. The clearance was 7 degrees. The points of the cutting blades were rounded to prevent injury by burning or chipping, and this reduced the effective rake near the horizontal tangent to this curve. It was for this reason that the blades were set leaning backward as in Fig. 12. But for this curvature at the point of the blades, the simpler construction of Fig. 11 would be per-

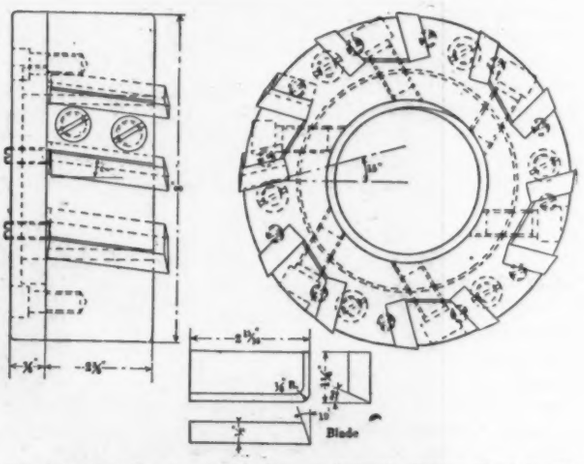


Fig. 12.—Details of an 8-In. Inserted Tooth Cutter Used in the Tests.

fectly satisfactory. The leaning back of the blades is rather a refinement than a necessary improvement.

The tests of these cutters were made on a vertical machine, which had the same driving parts as a horizontal machine of the same size, and besides an additional two shafts and four gears, so that it is safe to say that its mechanical efficiency must be less than that of the No. 4 horizontal machine used with the spiral cutter with nicked teeth. The action of the feed on a machine using this cutter may be somewhat different from that on a machine using spiral cutters. Whether there is such a difference and what it amounts to has not been ascertained by tests. The fact that, generally speaking, the face cutter with rake removes double the amount of metal with the same amount of power as compared to the spiral mill is significant and places the vertical machine in the front rank for slabbing work wherever it is possible to use this type. Equally significant is the fact that a cutter with rake removes 50 per cent. more metal than a cutter without rake.

The Pittsburgh office of the Ernst Wiener Company, New York, will in the future be located in the Union Bank Building, with John T. Cawley in charge.

Recent Improvements in Lifting Magnets.

The Electric Controller & Mfg. Company's Type S. A. Magnet.

The first commercial lifting magnet was placed in service in this country about 13 years ago. This magnet was designed by S. T. Wellman for handling plates and slabs, and proved fairly satisfactory for such service. The design was later improved by E. B. Clark, then electrical engineer for the South Works of the Illinois Steel Company. The manufacture of lifting magnets of both the Wellman and Clark types was taken up by the Electric Controller & Mfg. Company (then the Electric Controller & Supply Company), Cleveland, Ohio, more than 10 years ago. A special magnet testing machine was designed and installed and much valuable data bearing on the design of lifting magnets was secured.

Magnets of the Clark type used with excellent results in the handling of smooth homogeneous material such as plates, blooms and slabs, however, were useless for handling rough and detached material such as pig iron, crop ends and scrap. A magnet which would readily lift a steel ingot weighing 10,000 lb. would not lift a single pig of iron weighing 100 lb. The large amounts of pig iron and scrap handled by tedious hand methods at all steel and iron works and foundries offered a tremendous field for the saving of labor, providing a practical lifting magnet could be developed for the purpose. Perhaps the first experiments in this direction which gave promise of commercial results were made at the West Seneca plant of the Lackawanna Steel Company under the direction of E. D. Edmondson and L. R. Palmer, a lifting magnet being constructed which actually lifted pig iron, though in rather small quantity taking into consideration the weight of the magnet and its current consumption.

A commercially successful lifting magnet for handling pig iron, scrap and miscellaneous material was placed on the market by the Electric Controller & Mfg. Company in March, 1905. This magnet was built in two sizes, commercially known as No. 1 and No. 2 Type S Magnets. Over 150 of these magnets have since been placed in service. This type of magnet has also been introduced in Germany and England. Recently improvements have been made in these magnets, making them more dependable and efficient in the handling of material. A successful lifting magnet must withstand severe abuse and rough handling. It must operate under all weather conditions, and its insulation must withstand a voltage much higher than line voltage due to the inductive kick which occurs when the circuit of the magnet is opened. Its winding must not be injured by the heat necessarily generated within it, nor by external heat when the magnet is called upon to handle hot material.

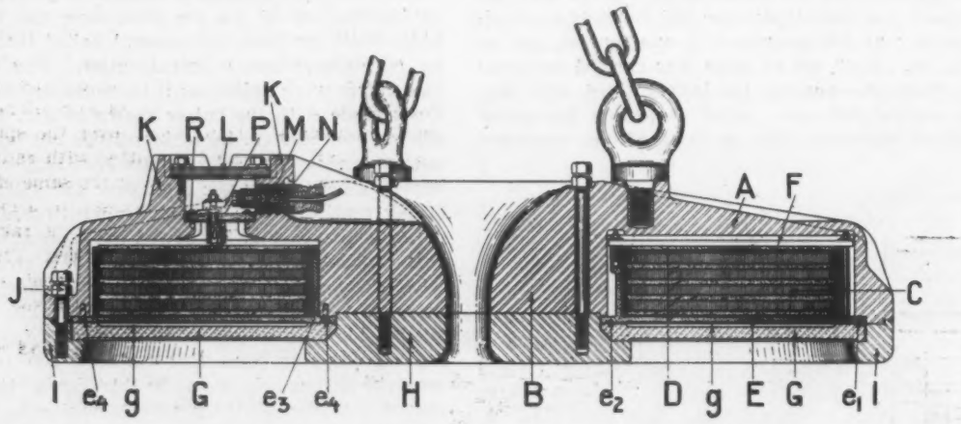


Fig. 1.—Section of the Type S. A. Lifting Magnet Made by the Electric Controller & Mfg. Company, Cleveland, Ohio.

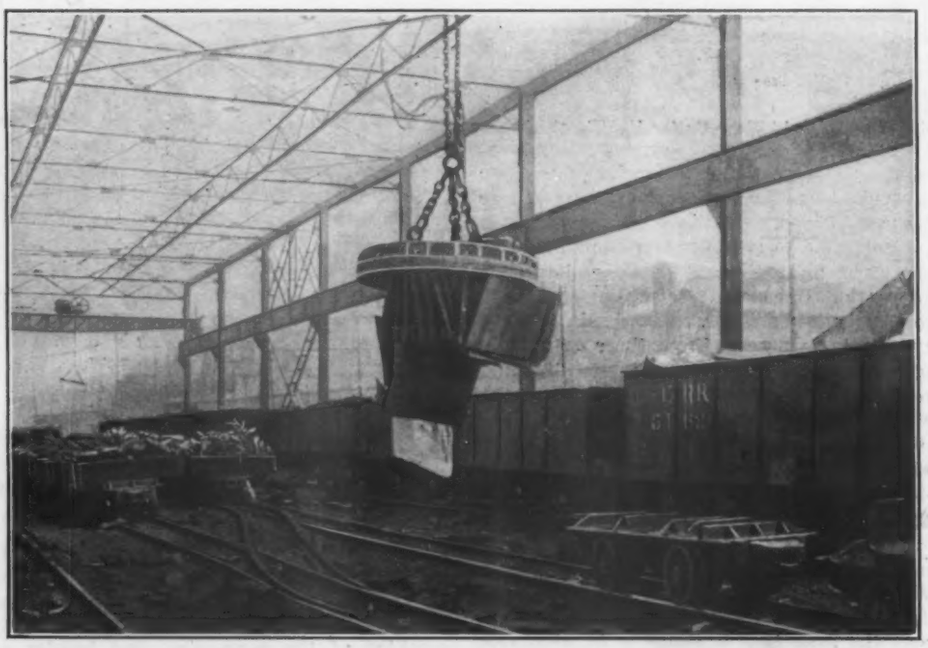


Fig. 2.—A No. 6 Type S. A. Magnet Lifting Plate Scrap Weighing 1800 Lb. at the Homestead Works of the Carnegie Steel Company.

Among the accompanying engravings Fig. 1 is a typical cross section of a type S. A. magnet, and shows the arrangement of parts. A is the body or frame of the magnet which is an annular casting of special electrical steel heavily ribbed on both its upper and outer surfaces. The ribs add surface for dissipating heat, stiffen the case and increase the cross section of the magnetic circuit. B is the core of the magnet surrounded by the winding

C. This winding is a series of coils of flat copper strips, the turns of which are insulated with asbestos. Neighboring coils are mechanically separated and electrically insulated by noncombustible insulating disks D. The coils are wound upon a heavy brass form E, which supports the coils during the winding and insures their uniform shape since there is no danger of springing or otherwise distorting the winding. After the coil is wound and the outer insulating disk in place, the entire winding is rigidly clamped to the form by radial straps F, which are bolted and locked in place, making the winding and the brass form which carries it a rigid unit. The completed winding is then dried in a steam heated chamber under a vacuum, next impregnated with a plastic insulating compound, first under a vacuum and then under air pressure, and finally is again dried under a vacuum. The completed winding, thoroughly fire and water proof, is then placed in the magnet case.

The form E has an outer flange, e_1, an inner flange, e_2, and the central vertical flange e_3, which centrally supports the winding. The inner and outer flanges are finished and engage with finished surfaces on the inner and outer pole faces of the magnet case, thus completely sealing the lower face of the winding chamber, a water tight joint being insured by clamping the flanges in place with screws e_4 e_4, spaced 4 in. apart entirely around the flanges e_1 and e_2. When the winding is thus assembled in the magnet case the lower face of the coil form E is covered by a heavy annular plate of nonmagnetic manganese steel, G, which in turn is held in place by pole shoes H and I, bolted respectively to the inner and outer poles of the magnet case. Both of the pole shoes have shoulders which protect the clamping bolts from shearing strains. The heads of the outer clamping bolts J are located between adjacent ribs on the outer surface of the magnet case, where they are protected from abrasion.

The manganese steel plate G carries raised shoulders around its inner and outer peripheries, by which the plate is made to seat against the magnet poles, and an air space or cushion is left under the winding at *g*. This causes shocks taken by the outer plate G to be transmitted directly to the magnet frame instead of to the winding, as would be the case if only a single bottom plate were used. The pole shoes are so disposed with respect to the outer plate G that none of the clamping surfaces can become battered over, and, therefore, the plate G may always be readily renewed. The entire lower or wearing face of the magnet is renewable, and

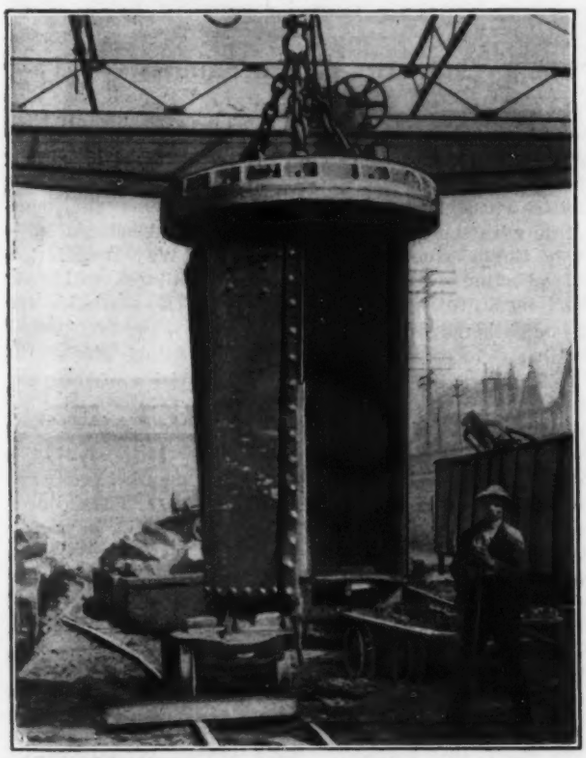


Fig. 3.—A No. 6 Type S. A. Magnet Lifting Three Charging Boxes.

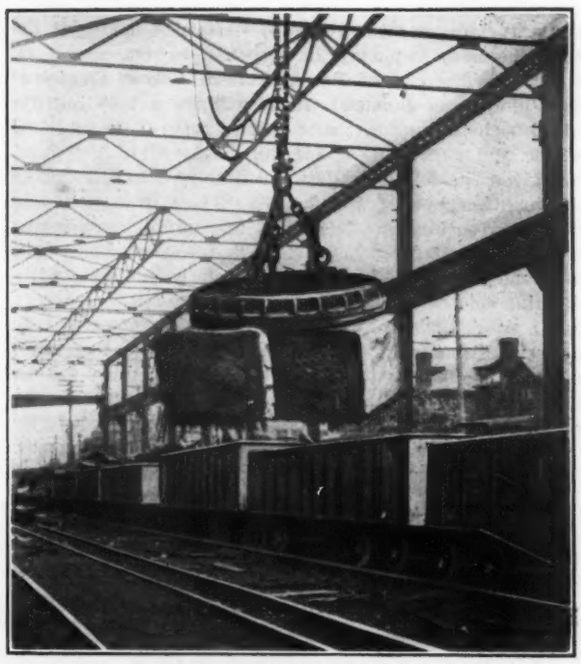


Fig. 4.—A No. 6 Type S. A. Magnet Lifting Two Ingot Butts.

renewals can be readily effected in the field, there being no occasion to expose or disturb the winding or break the water tight joint between the coil form E and the frame of the magnet.

The terminal cavity is surrounded by raised walls, K, K, cast integral with the magnet case, and thick enough to be as strong as the magnet case itself. The cavity is closed at the top with a heavy steel cover, L, which seats against a gasket to form a water tight joint, and is firmly bolted in place, the heads of the bolts being protected from abrasion by the walls of the cavity. The terminals themselves are of plug type, permiting quick attaching and detaching of the service wires. The female members M of the terminal are inclosed in an insulating tube, so that a ground or short circuit cannot result even if the service wires are left hanging from the crane with current on. The insulating tubes are each incased in a steel tube to prevent abrasion, and these steel tubes fit closely in babbitted openings, N, in the side of the terminal chamber. The male members P of the plug connectors are mounted upon a heavy plate, R, of fireproof insulating material, which closes the entrance to the winding chamber, and is seated upon a gasket to effect a water tight joint. The plugs proper are separable from the terminals by removing the nuts which hold them in place. The plugs and also the plate R may, therefore, be removed without throwing any strain on the connections to the winding, the connections consisting of loops of very flexible copper ribbon inserted in the boxlike ends of the terminal studs.

The No. 4 type S. A. magnet, 40 in. diameter, lifts substantially as much as older forms of magnets 50 in. diameter, with substantially the same current consumption, but weighs 2000 lb. less. Comparing the two magnets on a 5-ton crane having a 25-hp. hoist motor, with equal lifts, the No. 4 S. A. magnet has the advantage of 2000 lb. in total load to be lifted, or 20 per cent. of the total hoisting capacity of the crane. This will mean a saving in current consumption of 20 amperes on the part of the hoist motor, and by virtue of this lower current consumption and lighter load the hoisting speed will be higher and the amount of material handled in a given time materially increased. Proportional increases in efficiency are shown by the Nos. 5 and 6 type S. A. magnets. The No. 6 magnet is declared to be the most powful commercial lifting magnet which has ever been constructed. Figs. 2, 3 and 4 show a magnet of this size in use lifting a variety of loads.

A Feat in Furnishing a Power Unit.—A remarkable record for completion, shipment, and installation of a

steam turbine and generator was recently made by the Allis-Chalmers Company in response to an emergency order from the city of Frankfort, Ind., whose municipal light plant was damaged October 28 by a bursting flywheel. The order for a new unit to replace the wrecked engine and generator, specifying shipment in six days, was given the following day and delivered in Milwaukee on the afternoon of October 30. There was a nearly completed turbine in the shops, but no turbo-generator of the required frequency, phase and voltage was available, and a new one had to be entirely wound. Notwithstanding this fact, the generating unit, complete in every detail, was finished November 3 and was forwarded by a special express car designed for the shipment of automobiles, to Frankfort, where it arrived November 4, four days later, and by Sunday morning, November 8, the unit had been completely installed and connected to its auxiliaries. During that day the coils were baked out, and just 13 days from the time the original engine was wrecked the new unit was in regular operation, carrying the station load.

Effect of the Purity of Water on Its Industrial Use.

In connection with an investigation of the quality of surface and underground waters in different parts of the United States, R. B. Dole of the United States Geological Survey, has made an estimate of the saving that may be accomplished in the production cost of steam by the use of a plant for softening hard water. Mr. Dole says:

Analyses of Maumee River water, selected as a typical hard water, show that it contains incrusting solids amounting to 360 parts per million, 105 parts of which are suspended mud, &c., and the rest carbonate and sulphate of calcium with some magnesium, a combination which inevitably forms a hard scale in boilers. If this water were used in a 1000 hp. boiler, 100,000 gal. daily would be required. In six working days 1800 lb. of scale would be deposited in the boiler. In the following figures, the first set estimates the probable excess cost due to the use of bad water, while the second estimates the probable cost after purifying the water. The inference to be drawn from the difference in dollars and cents is obvious:

Cost with Use of Hard Water.

Average coal consumption for 1,000-hp. boiler, 48 tons a day; 48 tons of coal at $1.50 is $72. Estimated saving in fuel on this water due to use of treated water is 5 per cent. Five per cent. of $72 is $3.60 per day, or, for 300 working days	$1,080
Cleaning boiler, at $8 per week	416
Repairs for tubes, &c	200
Boiler compounds	250
Coal for raising steam after cleaning, 104 tons at $1.50	156
7½ per cent. depreciation on boiler plant costing $15,000	1,125
Total	$3,227

Cost with Use of Softened Water.

10 per cent. interest and depreciation on softening plant costing $3,500	$350
Boiler repairs	50
Chemicals at 1 cent per 1,000 gal	300
Coal for raising steam after cleaning, 16 tons at $1.50.	24
5 per cent. depreciation on boiler plant costing $15,000	750
Total	$1,474

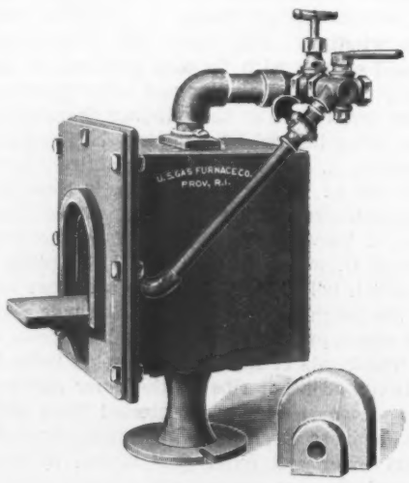
The total saving in a single year is, therefore, $1753, which is practically half the cost of installing a softening plant.

A bronze and tile memorial tablet in honor of the great French scientist, Andre-Marie Ampere, has been set up in the Lackawanna Railroad station at Ampere, N. J., by Dr. Schuyler Skaats Wheeler. This memorial will be unveiled by Monsieur Jusserand, the French Ambassador, who will come from Washington expressly for the occasion, at 3 p. m., Dec. 3. M. Ampere, who founded the science of electrodynamics, and whose name is used throughout the world to designate the unit of electric current, was born at Lyons in 1775 and died at Marseilles in 1836. Ampere, N. J., is the only place in the world named after this distinguished Frenchman, and the tablet is probably the only memorial raised to his honor in America.

The New United States Bench Forge.

The United States Gas Furnace Company, Providence, R. I., has brought out a new bench forge which is designed to meet the requirements of the tool room or machine shop. Work to which it is adapted includes drawing, forging or tempering tools, brazing, welding, heating stock for bending by passing the piece through the back entrance of the furnace, heating ends of rods for forging or stamping, and for hardening high speed steel tool holder bits. A ladle of babbitt can be melted if held on the front shelf, letting the flame circle around the pot.

The burner is so arranged that the flame heats the forge to a carbon steel or cherry-red heat in 3 min. The lining consists of a single piece of heavy firebrick, which



A Forge for Bench Mounting Made by the United States Gas Furnace Company, Providence, R. I.

can be easily and cheaply replaced. The parts are interchangeable. The equipment includes valves for gas and air. The forge may rest on a bench or on the floor, as desired. It has a heating space 3 in. wide and 6 in. long. The entrance is 3 by 3 in. It consumes 30 cu. ft. of gas per hour, and requires an air pressure of 1 lb. The bench or floor space is 9 by 9 in., and the weight, 50 lb.

Statistics of Rail Failures.

In a circular issued November 13, 1908, Secretary W. F. Allen of the American Railway Association, 24 Park place, New York, announces that the association's Committee on Standard Rail and Wheel Sections will co-operate with the Committee on Rail of the American Railway Engineering and Maintenance of Way Association in collecting statistics concerning rail failures, rail wear and service of special rail material. The statistics are to be gathered for periods of six months, the first period ending October 31, 1908, for which data are already in the hands of the railroads. By this division of the year a comparative study of rail failures in winter and summer months will be possible. Three blanks have been prepared for these statistics. The first will contain a summary of steel rail failures for six months, compared with the same period of the previous year. The failures are reduced to percentage of tons of rails laid, in preference to the number of rails per 1000 tons of rails laid, since the latter method does not take care of different lengths of rails. This blank will record also the specified chemical analysis of the particular lot of rails from which the failed rail came. Another blank contains data as to the position in the ingot of steel rails which failed. A third blank gives the record of comparative wear of special rails, and summarizes the information given in the other two blanks. Rails broken or injured by wrecks, broken wheels or similar causes are not to be included in the reports.

A Newton Horizontal Boring, Drilling and Milling Machine.

A new design of boring, drilling and milling machine recently furnished the Japanese Government by the Newton Machine Tool Works, Inc., Philadelphia, Pa., is shown in the views herewith. The spindle of this machine is 4½ in. in diameter and has three changes of geared feed, with a movement of 32 in. The spindle is fitted with a No. 6 Morse taper. The drive is from a 7½-hp. three-to-one variable speed motor, through an intermediate rawhide pinion and bevel gearing to the vertical driving shaft from which are driven the clutch bevel gears shown in Fig. 2, which gives the reversing motion to the spindle. This clutch is operated by the lever A. From these reversing bevel gears motion is transmitted to the sliding shaft B by the sleeve spur gear shown. The face plate pinion is cut from the solid shaft B and the pinion for the rapid motion to the spindle for drilling is a shrink fit; engagement or disengagement of the face plate or direct spindle drives is obtained by sliding the entire shaft by means of the lever C.

With the high speed gear engaged any speed is available from 33¾ to 101¼ rev. per min., and feeds of from 0.0178 to 0.124 in. per revolution. With the face plate pinion in mesh there is available a speed range from 10.44 to 31.44 rev. per min. and feeds from 0.005 to 0.038 in. per revolution. The feed is taken from the sleeve spur driving gear through the feed pull pin gears shown, changes of feed being obtained by the levers D. The feed is further transmitted by the clutch miter gears shown in Fig. 2, giving reverse motion to the feeds; this clutch is operated by the lever E. The connecting gear of this nest is fitted to a vertical shaft on which is mounted a worm meshing with the worm wheel on the horizontal trolley shaft shown. This permits of feeding the bar in either direction regardless of the direction of rotation of the spindle, or using the hand power feed or operating by hand power through the hand wheel E, or the hand wheel F, which gives rapid hand adjustment. From this worm wheel shaft the motion is further transmitted through the swinging worm wheel box which permits of engaging the worm with either the worm wheel on the elevating screw or the vertical spline shaft from which the vertical feeds and the feeds to the column are obtained, respectively.

With the face plate gear in mesh vertical feeds are available of from 0.3768 to 2.727 in. per revolution, and with the spindle gear in mesh feeds of from 1.13 to 8.182 in. per revolution of the spindle, and a fast vertical traverse of 69 in. at the highest speed of the motor and 23 in. with the slowest speed, and feeds to the column from 1.4 in. to 10 in. at the highest speed of the motor and from 0.16 in. to 3.33 in. at the slowest speed of the motor per minute, and quick movements of 24 and 8 in. per minute, respectively. This swinging worm is engaged by the lever F.

Fast movement for elevating the saddle, which is counterweighted, and to the column are transmitted from the horizontal driving shaft shown in Fig. 2 to the back of the column by a second horizontal shaft on which is mounted a double throw Carlyle-Johnson clutch. It is so arranged that the fast traverse to the column and the fast vertical traverse to the saddle can be operated from the lever H. The feeds and fast traverse to the column are obtained by means of a rack and spiral gear mounted on the back of the column.

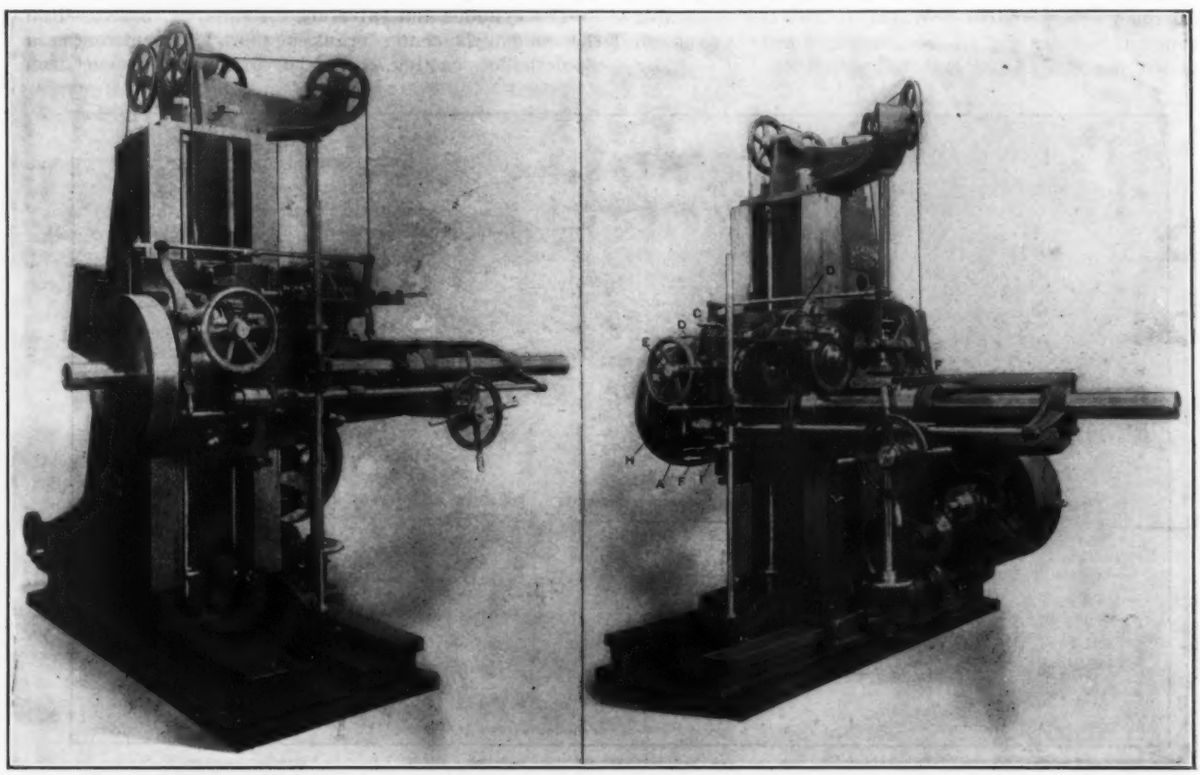


Fig. 1. Fig. 2.

Two Views of a New Horizontal Boring, Drilling and Milling Machine Built by the Newton Machine Tool Works, Inc., Philadelphia, Pa.

This design gives a very compact rigid machine with reversing motions to all operations, and with this style of horn the length of feed to the bar can be increased at any time should it be desired. On lever I is mounted a small vertical rod shown in Fig. 1, which prevents the slow traverse to the column and the fast traverse to the column, operated by lever H, being engaged at the same time. It will be noticed that on the elevating screw it is not necessary to clutch two drives, as it is immaterial whether the nut or the screw is revolved. The spindle can be adjusted from a minimum distance from the center of the spindle to the floor plate of 20 in. to a maximum distance of 68 in., and the column has 4 ft. of horizontal movement, although this can be made of any length desired. The face plate of this machine is 28 in. in diameter over all.

The Teton River Light & Power Company, St. Anthony, Idaho, has filed articles of incorporation with a capital stock of $1,000,000, the purpose being to install a hydro-electric plant on the Teton River in Fremont County, Idaho, to supply current for light and power to a number of towns within a radius of 20 miles. It is estimated that 16,900 hp. will be developed. John Donaldson is president of the new company.

New Ridgway Side Crank Engines.

A line of side crank engines is the latest addition to the product of the Ridgway Dynamo & Engine Company, Ridgway, Pa. For some purposes the side crank construction is most satisfactory, although it lacks certain advantages of the center crank engine. Like the center crank type which this company has built for some time, this engine has been designed for simplicity, strength and quality, rather than for cheapness. All parts are made to gauge and wherever possible are interchangeable. Each completed engine is tested for from 10 to 24 hr. under full and over load conditions.

The bed is of heavy design. The main part is of box section and has large bored guides. The guides and end for the cylinder are bored and turned at one setting, on a special machine, insuring perfect alignment. The nuts on the studs holding the cylinder are placed outside in recesses in the end of the bed and are covered by a polished steel band. At the cylinder end of the bed is a removable partition provided with sectional packing around the piston rod to prevent oil from being thrown against the end of the cylinder. Between the cylinder and the partition is a well in which the drip from the stuffing box is caught. The water is removed by a separator and the oil flows back to the crank pit. Ample openings are provided for packing the piston rod stuffing box, and other openings, closed by light cast iron doors, give easy access to the cross head and pin. The crank disk is covered with an oiltight guard of light sheet steel, hinged at the top, so that it may be turned back over the bed, giving access to the connecting rod and crank pin. A small opening in the side of the guard has a swinging cover, allowing inspecting the crank pin while the engine is in motion.

The main bearing on all sizes is of the quarter box type, with babbitt lined shells. Horizontal adjustment is secured by a wedge and vertical adjustment by drawing down the cap. The top and bottom shells are interchangeable and all shells may be quickly and easily removed without taking the shaft out of the bed.

The connecting rod is an open hearth steel forging. The straps at both ends are slotted from solid forgings. The wrist pin box is of solid phosphor-bronze, and the crank pin box is lined with babbitt. Both ends are adjusted by the wedge and bolt method.

The cross head body is cast steel, and the shoes are cast iron, faced with babbitt. The upper shoe is bolted solidly to the body and the lower one is adjustable. Four hollow bolts pass through the cross head body, inside of which are the cap bolts, which hold the shoe firmly. Both the top and bottom shoes can be adjusted by the use of shims. The wrist pin is 0.5 per cent. carbon steel, tapered to fit seats in each side of the cross head body and provided with keys, so that it may be turned 90 degrees as it wears.

The main shaft is a single open hearth steel forging, extra large in the bearings and governor wheel hub. The crank disk is a semisteel casting, very tough, close grained and hard. Because of the large size of the crank pin and the shaft at the crank fit the crank pin is cast solid with the disk. After the pin is turned and the shaft fit bored the crank is forced on the shaft under hydraulic pressure and secured by a heavy key.

The outboard bearing pedestal is heavy and broad at the base to insure stiffness. The bearing is self-oiling and self-aligning and has babbitt lined shells. Vertical adjustment is accomplished by a special device applied to the four holding down bolts at the base of the pedestal. Horizontal adjustment is made by ordinary set screws in lugs on the pedestal subbase.

The cylinder and valve are the same as those used on the company's center crank engines. The piston is a single hollow casting, strong but light, and has cast iron snap rings of a special design, which effectually prevent leakage without appreciable wear on the cylinder walls. The piston rod is large and of machinery steel. The rod and piston are joined by a force taper fit, supplemented by a jamb nut. The rod screws into the cross head with a long, fine thread and is prevented from turning by a jamb nut. This jamb nut is further held by a set screw in the cross head body.

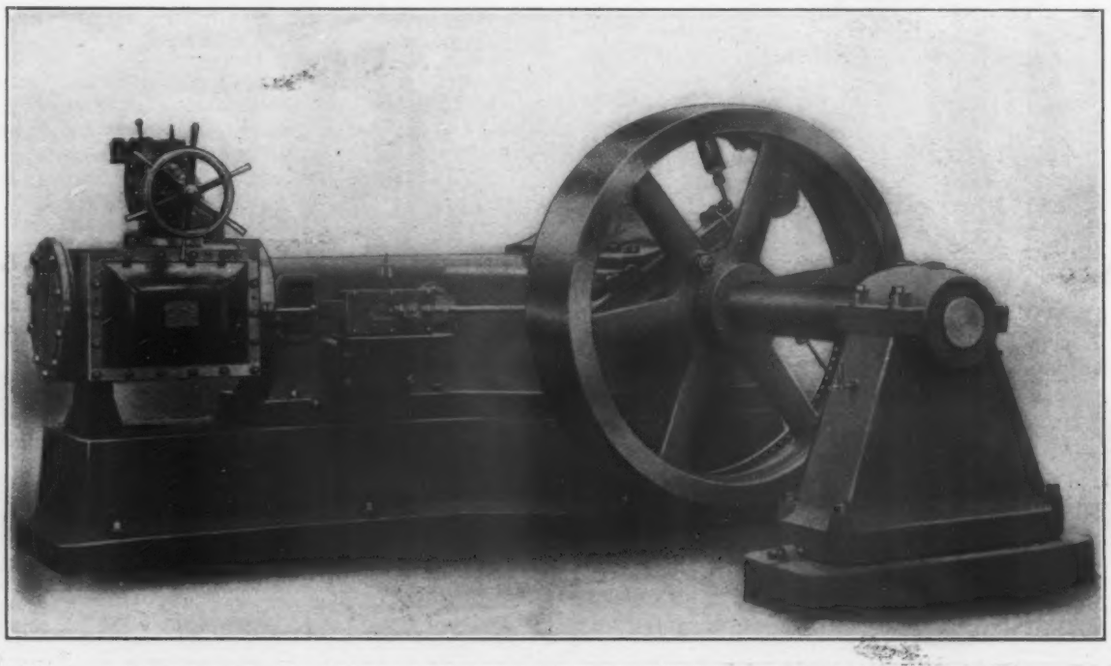


Fig. 1.—An Example of the New Side Crank Engines Built by the Ridgway Dynamo & Engine Company, Ridgway, Pa.

The most important part is the governor. Perfect regulation is very essential, especially in engines for driving electrical machinery. The Ridgway governor was formerly known as the Begtrup and is of the inertia type. A long bar, called the inertia bar, having weights at each end, is pivoted at the center on a roller bearing. The main pin is large and heavy and of steel, hardened and ground. The inertia bar is lined with hardened steel bushings and the space between the pin and bushings is filled with hardened steel rollers. This insures a minimum of friction, and the bearing is subject to very little wear. This is the only bearing requiring lubrication, although it will go without attention for several weeks. To the hub of this bearing is clamped the eccentric, which is keyed in place and is also held by set screws. The eccentric and eccentric strap being split, are removable without disturbing the governor or the setting of the valve. A heavy coil spring is secured to the middle of one end of the bar. Opposite the spring is an oil dash pot, consisting of a cylinder with a loose fitting

piston and a connecting rod bolted to the inertia bar. A by-pass with an adjustable opening allows the oil to circulate from one side of the piston to the other. The governor is perfectly reversible without the use of any extra parts.

Referring to the accompanying illustration of the governor the action is as follows: Rotation is from right to left; the weight in the spring end of the bar being the greater, centrifugal force tends to swing it outward and backward toward the lower stop. This tendency to move backward is balanced by the spring, the tension of which is such as to hold the inertia bar in equilibrium when the engine is at its desired speed. When starting up, the position of the governor parts are as shown. In this position the eccentric travels in its greatest path, giving the valve its widest opening and latest cut-off. As the speed increases centrifugal force, acting on the weighted end of the inertia bar, moves it backward toward the lower stop, thereby reducing the travel of the valve and cutting off steam earlier. This backward movement of the bar is continued until the travel of the valve reduces the cut-off to just the amount necessary to keep the engine rotating at its proper speed to give even balance between centrifugal force acting on the inertia bar and the opposing tension of the spring. When load is applied to the engine there is a check to the speed of the governor wheel, while the inertia bar, by reason of its momentum, rotates forward sufficiently to increase the valve travel and give late enough cut-off to carry the load. Should the load be thrown off, the governor wheel tends to increase its speed, thus causing the inertia bar to swing backward and reduce valve travel and cut-off until equilibrium is established as before. From this it will be seen that the speed of rotation under a steady load depends entirely upon the equilibrium between centrifugal force acting on the inertia bar and the tension of the governor spring, while the actual movement of the governor parts is effected by the inertia of the weighted end of the bar.

If the weight in the inertia bar and the tension of the spring are so adjusted that the centrifugal force increases faster than the tension of the spring, then the engine will speed up under load. In this condition the engine is liable to race, and it is to prevent racing that the dash pot is used. It is thus possible to adjust any engine so that it will run faster under load than when running light, and still have it regulate perfectly with no tendency to race. Contrariwise, the governor may be

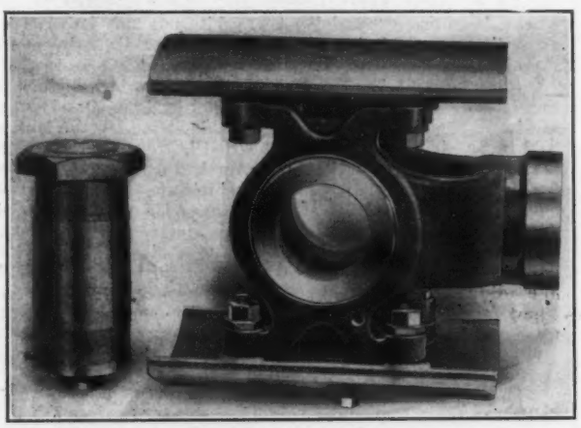


Fig. 2.—The Cross Head and Wrist Pin.

adjusted to run slower under load than with no load. Dash pots are used on all engines, as by their use perfect stability is obtained, and at the same time they increase the ease with which adjustments may be made. No difficulty, it is claimed, is experienced in adjusting this engine to govern within a limit of one revolution, and the instantaneous variation of speed when the entire load is thrown on or off is less than 2 per cent., while the action of the governor is unusually quick, the engine returning to its normal speed with a single vibration and within a space of 2 sec.

The valve gear, which may be seen in the illustrations, is simple and strong. The ram slide has a long bearing and is provided with horizontal and vertical adjustments. All pins and rods are of machinery steel. The eccentric strap is lined with babbitt and the bearing at the slide is lined with a replaceable bronze bushing having a screw adjustment.

Two standard methods of lubricating are provided. In the first, the splash system, the crank pit is filled with oil, which the disk throws over the cross head and guides. Oil from the upper guide is wiped off by the top cross head shoe and flows through passages and pipes to the cross head pin. Pockets on the inside of the crank

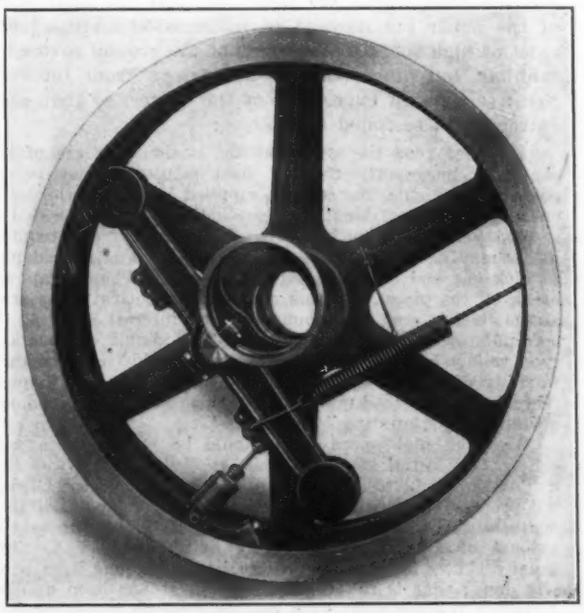


Fig. 3.—The Flywheel and Governor.

guard collect oil, which is led through passages to the main bearing and to the crank pin. All bearings are, therefore, practically flooded at all times. The second system uses a small filter placed in one side of a tank, which is mounted on the subbase below the slide bracket. In the other side of the tank is a valveless pump driven by a cam on the valve gear ram. This cam gives a full stroke regardless of the travel of the ram. All oil from the bearings flows to the crank pit, from which it is piped to the filter; then passes to the pump chamber, where it is pumped to a large tank on top of the bed. From this tank the oil flows through nickeled piping to each bearing. Sight feed valves in each pipe near the tank regulate the supply. As the engine is fully inclosed, no oil can be thrown on the floor or into the governor wheel. With either system the valve gear is supplied with grease cups.

This engine is built in the simple, tandem and cross compound types. In the compound types the low pressure valve is of the balanced type. On tandem engines both valves are driven by the governor, the low pressure directly and the high pressure by a tail rod on the low pressure valve. On cross compound engines the high pressure valve is driven by the governor and the low pressure by a fixed eccentric on the main shaft; otherwise the valve gear is identical for each cylinder. Simple and tandem compound engines from 50 to 800 hp. and cross compound up to 1500 hp. can be furnished.

The records for November are not available, but indications are that the net result of the movement of aliens to and from the United States in now in favor of this country. In October there was a net influx of 6249. In November the departures showed a lessening tendency, while the arrivals increased. The arrivals through all ports in October were 40,994, against 111,513 in October, 1907, and 99,974 and 86,758 for that month in 1906 and 1905 respectively. For the first 10 months of this year the arrivals were 327,240, against 1,150,116 and 1,035,602 for the like periods in 1907 and 1906 respectively.

Notes on the Use of High Speed Steel.

A pamphlet has been issued recently reprinting a paper on "Tool Steel," read by Fred. M. Osborn, Sheffield, England, before the Leeds Association of Engineers. Mr. Osborn is of the firm of Samuel M. Osborn & Co., Ltd., who are represented in the United States by B. M. Jones & Co., Boston. The paper takes up first the history of the early manufacture of tool steel and then reviews at some length the Bessemer, open hearth and crucible processes of steel making. Coming to the manufacture of crucible cast and high speed steels, the operations of crucible steel works are described, and the final pages of the paper are devoted to information on the treatment of high speed tools. Some of the ground covered is familiar, but other portions are drawn from the comparatively recent experience of the writer, so that some extracts will be found of interest:

However good the steel may be, if the tools are of bad shape or improperly treated, good results cannot be expected. As a rule, the steel is supplied in bars; in order to cut these into tool lengths they should be slowly heated to a good yellow and nickel hot. If necessary, the required pieces may be cut right off while hot; but it is a good plan to nick hot and allow the bar to go cold. Then a tap will break off the piece. By this means the beautiful silky grain of the steel is seen, and confidence and interest given to the manipulators. Forging the tool to shape should be done at a good yellow heat. "Avoid working too cold" is a common warning of the steel maker to the steel user, and frequent reheating of the steel makes the work easier for the men, and obviates any "bursting" of the steel.

Although high speed steel should be worked at a good yellow, this initial heat should be applied gradually, so that it "soaks" right to the center of the bar. The heat hardening process consists in bringing the nose of the tool to a white blistering heat, and then immediately blowing cold in a blast of air. The appearance of the end of the tool usually shows by the scale if the hardening has been properly done; that is to say, if enough heat has been applied. Although the air blast as a cooling medium is desirable, it is not absolutely necessary. Oil for many purposes is as effective, and even without either, good high speed steel hardens naturally after being raised to a high temperature.

High speed tools should be well ground before use, in order to remove the outer burnt skin, plenty of water being allowed to flow over the nose to keep it from becoming blue with the heat and thereafter probably cracking. Sandstone is generally recommended, though emery wheels are being specially made for high speed steels and sold by makers of grinding machines.

A plan which is recommended, in order to save some hard work, is to forge and grind the tool to shape before hardening, then apply the heat treatment and give a second grinding to the hardened nose. By this means the work done on the wheel is mostly applied to the unhardened steel.

Tools of intricate shapes, after being forged, should be annealed before the heat hardening process, which should be applied to the point of the tool only. This annealing could be done by leaving the tools in a smith's hearth over night. The design of turning tools of high speed steel is most important. The points to remember are strength, support, section and suitable cutting angles.

With regard to the cutting angles for ordinary roughing work, Dr. Nicholson recommends *Engineering*, November 24, 1905, for cast iron, 80 degrees; for soft steel, 70 degrees.

Perhaps data recorded by the writer (by observation) while experimenting on a 16-in. high speed lathe may be of interest. The following were found to be the best angles:

For soft steel (C. 0.20).....65°; front clearance 5°
For moderately hard steel (C. 0.50)....70°; front clearance 5°
For hard steel (1 per cent.).....75°; front clearance 3°
For hard cast iron.....80°; front clearance 10°

Results in Turning Tires.

An instance of the use of high speed steel for turning may be of interest: At the New York Central shops, with high speed tools 3 x 1½ in. in section, Midvale tires, 6 ft. in diameter, were turned up at 14 ft. per minute, ½ in. feed, 7-16 in. depth of cut. A pair of tires was turned in 43 min. The tools when taken out were found in good condition.

It should be emphasized that high speed steel is very suitable for use in automatic lathes, and also for forming tools, provided the hardening is suitably done.

Before leaving the question of power, it should be remembered that a badly ground tool, or a tool ground to incorrect angles, will absorb much more power than correctly ground tools. In the former case the heat generated has been much greater, and this proves clearly that more driving power has been required. A clean and smooth chip indicates that a minimum of driving power has been absorbed.

Visitors to Clyde Works during the meetings of the Iron and Steel Institute in Sheffield saw a Mushet high-speed tool, 1¼ in. square, turning a Siemen's Martin forging at 66 ft. per minute, ¼ in. feed, ⅝ in. depth of cut. The points of tools which have become actually red hot and continued to work in this condition show the wonderful property high-speed steel has of retaining its cutting qualities, even when intense heat is generated.

The Proper Position of the Tool.

The correct position of a turning tool varies, according to the job operated upon. For light work, the cutting point should be about on a level with the center; for heavy work, the point should be above the center, anything from ⅛ in. upward, the amount increasing with the diameter of the work. The writer has demonstrated that as much as ¾ in. over the center is not too much on a good stiff job. If the tool is below the center, even if ground to an apparently suitable angle, there is a danger of "digging" and pulling the nose of the tool off, or even fetching the work out of the centers.

Steels suitable for use in tool holders can be supplied in high-speed steel, either in the bar for forging in the usual way, or ready hardened in the bar for cutting off with an emery wheel and grinding to shape without any heat treatment. A good quantity of the old type of self-hardening steel is sold for use in this way.

With regard to finishing cuts, it may be said that by taking a fine feed a smooth finish can be left, even when turning at high speeds, but generally a superior quality of oil or water hardening steel is recommended for a finishing cut, such as is required on a piston rod.

The heat treatment of high-speed steel is most important. The fact that bars and blanks can be softened so that they can be filed and tooled to any shape without difficulty has undoubtedly extended its utility enormously. Should users wish to soften the steel, there is no difficulty about it. The bars, pieces or blanks, should be heated very gradually, in a closed furnace or muffle, until they are raised to a bright red, exceeding 700 degrees C. The entrance of all cold air into the furnace should then be provided against, and the furnace allowed to cool as slowly as possible until the bars are quite cold. The slower the cooling the softer the bars will be.

Twist Drills and Milling Cutters.

There are no less than 21 operations in making a twist drill, from the annealed stock to the finished article. The quality of the product mainly depends upon the steel from which it is made. Fluting may be done with formed milling cutters of high-speed steel, both grooves simultaneously at one operation. After the backing off, the drills are hardened, sand blasted and ground. The hardening of high-speed twist drills is a most important operation. It is obviously not desirable to heat the drills so that they scale, as one may a turning tool. It is therefore necessary in some way either to protect the drill from the flame or exclude the air from contact with the drill.

An excellent arrangement, and one applicable in any works, is to use a "bath." A graphite pot may be placed in an ordinary smith's hearth, and lead or certain salts melted therein to the desired temperature (say, 1300 degrees C). The article to be hardened should be warmed through, then finally heated in the bath; it is cooled by immediately dashing in oil, removed from that when black red-hot, and blown cold in an air blast. Another method is to use a cyclone gas blast furnace. The writer recently had an electric hardening furnace at his disposal, in which the bath of salts—barium chloride—melted at 950 degrees C., was kept at the required temperature by means of an electric current passing through it. In this bath, which was easily raised to 1300 degrees C., the steel articles were quickly brought to the hardening heat, which was read off by an optical pyrometer. The temperature of the furnace could be easily controlled by means of an external resistance. Turning tools, twist drills and milling cutters were all hardened with satisfactory results.

The cutting angles and clearance of high-speed twist drills are most important features. Should the points of a drill be unevenly ground (and it does not break in work), it will be found to bore an eccentric hole, one lip having done all the duty. The lips must be of equal length and at the same angle. The angle of the cutting point should be 59 degrees for steel, but for cast iron it may be much more pointed. At Clyde Works an angle of 45 degrees has been adopted for experimental work on cast iron.

With regard to the relative merits of high-speed and carbon steel drills in the test, one high-speed drill (which cost 7s. 2d.) did the work which it is estimated it would have taken 24 cast steel drills (costing £3 9s. 0d.) to do. The drill only wore 1 3-16 in., that is, 4161 ft. of steel were drilled per inch of drill worn away. Taking the rate of feed to be 3 1-3 in. per minute for the high-speed and ½ in. for the cast steel drills, the hours actually taken in drilling would be 85 for the high-speed, as against 580 for the cast steel; that is, one-eleventh of the first cost and one-seventh of the time in favor of high-speed drilling. The use of high-

speed steel for reamers is finding favor, as the life is greater and the accuracy of the tool is longer preserved. It is important that they, too, should be correctly ground.

What has been said regarding high-speed twist drills and reamers largely applies to high-speed milling cutters. Having secured some reliable, well annealed steel, the operator may start with confidence. In large plain milling cutters it is a good plan to have notched teeth, as by that means the chips get broken up and are less liable to clog the teeth. As in the cases of twist drills and reamers, great care must be taken in hardening not to burn the teeth, and proper appliances should be obtained. The use of high-speed milling cutters has produced some astounding results. Better will still be obtained as those responsible for the design of millers adapt their construction to withstand the greater strains caused by working at high speeds, and as the workmen get the confidence to put on the speed and feed.

A New G. E. Electric Furnace.

To secure the best results in annealing and hardening it is important to have a constant temperature in the furnace, and it is often desirable to adjust the temperature of the furnace. In the new type of electric furnace now being manufactured by the General Electric Company, Schenectady, N. Y., for operation on alternating current circuits, metallic salts are reduced to a liquid state by means of an electric current. As soon as these salts reach a liquid condition the temperature can be easily regulated by varying the amount of current passing through the bath. By this method of regulation any temperature will remain uniform throughout the bath except at the surface, where it is slightly lower, due to radiation. This applies, however, to a depth of only 0.6 to 0.75 in.

In Fig. 1 is shown an electric furnace outfit installed in the die department of the Schenectady works of the above company. The outfit, as can be seen, consists of the furnace, with its hood suspended from above; the regulating transformer, with regulating switch; the switchboard, with ammeter and voltmeter, and the incoming line with fuses. The regulating switch has a sufficient number of contact points to give almost any temperature between 250 and 1350 degrees C.

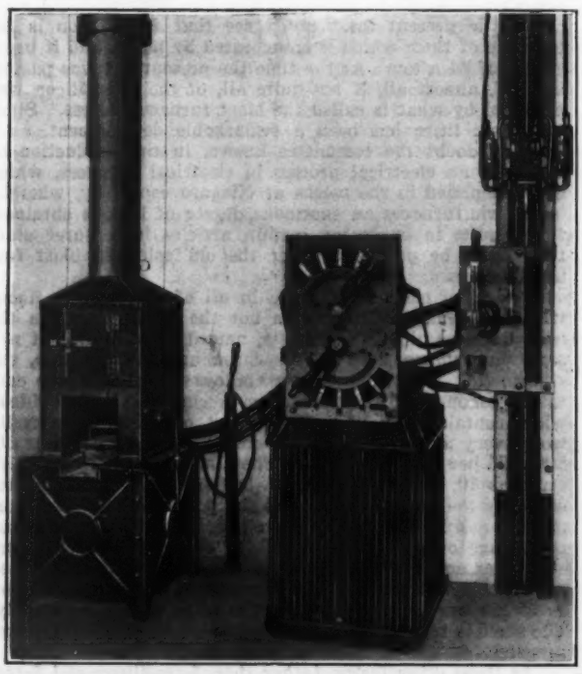


Fig. 1.—One of the New Electric Furnaces Installed in the Schenectady Works of the General Electric Company.

The furnace, a sectional view of which is shown in Fig. 2, consists of a fire clay crucible, surrounded by insulating material, usually asbestos, which rests in a fire clay box; all being supported by an inclosing case of iron. Two electrodes, connected to the low tension side of the transformer, are placed on each side of the crucible and are in direct contact with the bath at all times. To start up the furnace an arc is started across the broken flux by means of an auxiliary electrode, and in a very short time the solid mass is in a molten condition. After the bath has reached its proper temperature that portion of the material to be hardened is placed entirely in the liquid bath, and is allowed to remain there until it attains the same color as the bath, when it is removed and tempered in water or oil, as the case may be.

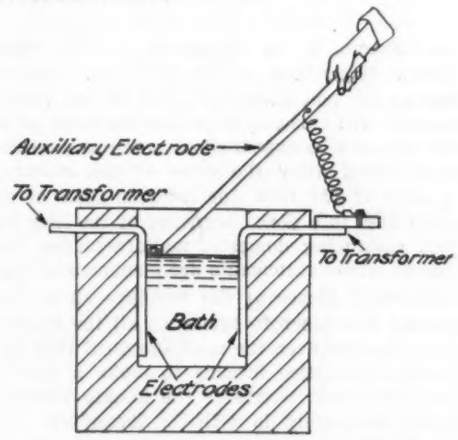


Fig. 2.—Sectional Diagram of the Furnace.

The bath for hardening or annealing completely fills the crucible, and in this case consists of equal portions of barium and potassium chloride. The ultimate temperature depends on the relative proportions of the two chlorides, the higher the percentage of barium chloride the higher the temperature may be carried. In addition to hardening, the furnace may be used for softening tempered steel, the bath being maintained at a temperature of about 250 degrees C. for this work.

Advantages of this type of electric furnace are: No chance for oxidation, for the material while being heated does not come in contact with the air; all parts of the tool subjected to the same degree of heat at all times, thus preventing any possibility of strains or overheating; high efficiency and low cost of operation, and practically no danger from fire, as the outer walls of the furnace are never hot (when the bath has a temperature of 1300 degrees C. the hand can be held on the outside of the furnace). The furnace is so simple and requires so little care and attention that it can be operated by an ordinary workman. The metallic salts have no effect on the composition of the steel, and the operator never comes in contact with dangerous fumes as in the cyanide bath.

In the manufacture of machine tools, automobiles, razors, knives, firearms, jewelry, fine instruments, &c., where accurate tempering is required, this electric furnace, it is believed, will prove especially serviceable.

An Idaho Hydro-Electric Power Proposition.—An important water power development is about to be undertaken by the Slate Creek Electric Light & Power Company, Wallace, Idaho, which was recently organized and capitalized with a capital stock of $3,000,000. The company is the owner of two rights for the diversion of the waters of Slate Creek, a tributary of the St. Joe River, in Shoshone County. The power site is situated about 20 miles southeast of Wallace in the Cœur d'Alene mining district. The power plant will be located within 1500 ft. of the Chicago, Milwaukee & St. Paul Railroad Company, now being constructed along the St. Joe River. According to the estimates of engineers the amount of power available from the water rights of the corporation is not less than 2500 hp. A transmission line will carry current from the generating plant to the city of Wallace, to be used for light, heat and power, which will also be distributed to other towns and villages in the Cœur d'Alene District. It is expected that construction of the work will be begun at an early date. Contracts for the erection of the power plant have not yet been let, nor has any machinery been purchased. The officers of the company are: Thomas McGowan, president; H. J. Rogers, vice-president; F. M. Buckingham, secretary; Jesse Freeman, treasurer.

TARIFF HEARINGS AT WASHINGTON.

Written and Oral Statements on the Metal Schedule.

Manufacturers Suggest Some Reductions.

WASHINGTON, D. C., December 1, 1908.—The Ways and Means Committee on the 27th ult. completed the hearings on the metal schedule, and on the 4th inst. the entire series will close, after which the work of drafting the new bill will be expedited as much as possible. The winessses heard after the close of the report in last week's issue of *The Iron Age* included some of the most prominent men in a dozen branches of the iron and steel industry, embracing domestic manufacturers, importers and dealers whose statements are summarized below.

A backward glance at the hearings since they were inaugurated November 10 furnishes all the evidence necessary to convince even the most skeptical that the Ways and Means Committee intends to make a thorough revision of the tariff, whatever the Senate Finance Committee may ultimately do with the House bill. That the House will cut many rates is guaranteed by the acquiesence of manufacturers in important lines, who have already appeared at the hearings and agreed to accept reductions. Several important items of the chemical schedule bearing duties above 25 per cent. will be cut to that figure, and there will be substantial decreases in the rates on crude minerals included in Schedule B. The plate glass rates are marked for reduction, and the domestic manufacturers are prepared to concede it. In the metal schedule the iron ore producers have agreed to take a cut of 20 per cent., and will probably have to stand a heavier reduction, if, indeed, iron ore is not placed on the free list; the producers of bars, blooms, billets, &c., have recommended a 10 per cent. reduction in their own products and the committee is likely to double this cut. Other items of the iron and steel schedule will be reduced in proportion to the reduction on the cruder forms of metal, as the rates on advanced manufactures of all kinds include a compensatory factor to offset the duties on the so-called raw materials.

The lumber schedule will go under the knife among the first, and the present rate of $2 per thousand feet on rough lumber will certainly be reduced to $1 and possibly will be wiped out altogether. There is much pressure for free rough lumber, and even American mill owners believe that the Canadian Government could be induced to rescind certain decrees imposing restrictions on the exportation of logs if the existing $2 tariff rate could be wiped out or materially reduced. Taking all these points into consideration, it is clear that the reductions now practically guaranteed will be sufficient to render the new bill a bone fide tariff reduction measure if not a decidedly radical proposition.

Complaints have recently been made by many witnesses concerning the attitude of apparent hostility on the part of the members of the Ways and Means Committee, both Republicans and Democrats, toward the representatives of the leading industries of the country who have appeared before them during the past week, and a word of explanation may not be out of place. Members of the committee are much fatigued, both physically and mentally by their arduous labors, having been in almost constant attendance upon the hearings for three weeks, from 9.30 a.m. until midnight, with only an hour's intermission at noon and another hour from 7 to 8 p.m. The result is that several members of the committee have grown exceedingly petulant and have shown much asperity in their cross-examination. While much of the harshness exhibited toward witnesses, and apparently reflecting the purpose of the committee to slash the tariff heavily, is due to nervous tension, it is only fair to state that it is also in a measure attributable to the great disappointment felt by the majority leaders at the attitude of the iron and steel men. The representatives of these interests were expected to bring to Washington specific recommendations for moderate reductions in many leading items of the metal schedule, but, on the contrary, the majority of them have advocated a standpat policy, at which Chairman Payne and his Republican colleagues have become greatly exasperated. The metal schedule has been marked for notable reductions, and the Republican members of the committee had anticipated making an excellent showing for the new tariff bill in its entirety by taking off an average of at least one-fifth the protection afforded by this schedule in the Dingley act. This plan may be carried through, notwithstanding the protests of the producers. Of course it should be borne in mind that the Ways and Means Commitee is engaged in making the House bill only, and that past experience indicates that the Senate Finance Committee will have the last word regarding the new tariff law as it goes on the statute books. W. L. C.

The first witness to address the committee on November 25, after the close of the report of the hearing in *The Iron Age* of last week, was Evart Brown of New York City, attorney for the Electro-Metallurgical Company, who spoke in behalf of adequate protective duties on the more costly ferroalloys. Mr. Brown said in part:

Statement of Evart Brown, Representing the Electro-Metallurgical Company.

The Electro-Metallurgical Company, whom I represent here, has interests in common with other manufacturers in the United States, and I am empowered to say that their interests jump together in this matter. The subjects which they wish to discuss are ferrosilicon, which is enumerated in paragraph 122 of the tariff act, and several other ferroalloys, some of which have rather curious names to the ordinary individual, such as ferromelybdenum, ferrotitanium and ferrovanadium, and some of which have names that perhaps have become a little more current by reason of their being seen in the newspapers, such as ferrochromium and ferrotungsten.

In the present tariff act I see that ferrosilicon is the only one of these which is enumerated by name, and it bears a duty of $4 a ton. At the time the present act was passed, in 1897, almost all, if not quite all, of the ferrosilicon was produced by what is called the blast furnace process. Since that time there has been a remarkable development, as I have no doubt the committee knows, in the production of alloys by an electrical process in electrical furnaces, which are exemplified in the works at Niagara especially, whereby in electric furnaces an enormous degree of heat is obtained, that results in producing certain articles in a purer state than could be produced under the old-fashioned blast furnace processes.

The chief element of value in all of these ferros about which I speak particularly is not the ferro, which is the iron, but several other elements, named secondly but of primary importance, such as the chromium, the tungsten, the silicon, &c. The value of these alloys varies with the contained amount of that secondary element. A ferrosilicon which contains only 10 or 12 per cent. of silicon is naturally worth very much less than a ferrosilicon which contains 60, 80 or 95 per cent. of silicon. The kind of ferrosilicon which contains 10, 12 or 15 per cent. is the kind which was produced by the blast furnace, and the possibilities of that furnace were exhausted in producing ferrosilicon of about that percentage of silicon; whereas, the electrical processes and also other nonelectrical but chemical processes, have resulted in producing ferrosilicon that has as high a degree of silicon as 95 per cent.; and, of course, the price varies accordingly. The same is true of these other ferros—ferrochromium, ferrotungsten, &c.

As these other ferros (other than ferrosilicon and ferromanganese, which are enumerated in paragraph 122) were not being imported into this country, there was no place for them in the tariff act by name. They had to seek such classification as they could under general language. It was claimed, on behalf of the Government and the Treasury Department, that the logical place for them was in paragraph 183, which provided for "metals unwrought"; and it seemed to the Government that that clearly covered them, and that a duty of 20 per cent. ad valorem should be put upon them accordingly. The importers, however, claimed that that expression, "metals unwrought" did not cover these articles; that, therefore, there was no niche for them in the tariff act, and that consequently they became nonenumerated articles, and in so becoming nonenumerated articles they became subject to what is called the "similitude clause." That is section 7 of the present tariff act, which

provides that when an article is not enumerated in the tariff act it shall be classified and take duty according to the article which it most resembles in material, quality, texture and use. They claimed that while these articles were not enumerated they did assimilate to articles which were enumerated, to wit, ferrosilicon and ferromanganese, in paragraph 122, and that, therefore, they took a duty of $4 per ton.

It happens that some of these ferros are extremely valuable. Ferrovanadium, for instance, runs as high as over $4000 per ton in foreign value, and a duty of $4 a ton, it was thought in many circles, was an infinitesimal duty, and one which was not in accordance with any intention which anybody in Congress might have had.

The case went into court in New York, and it was there held by the Circuit Court of Appeals for the Second Circuit that the expression "metals unwrought" covered only metals capable of being wrought, and that it must be such a metal as could be made in and by itself into utensils or definite, particular objects; and that the use of a metal to melt up with other things to make a compound to perfect the compound or for some similar purpose was not such a purpose as could enable an article to be called a "metal unwrought."

That distinction was temporarily accepted by the Treasury Department, and all these ferroalloys came in at a rate of duty of $4 a ton, which was practically nothing on many of them. But subsequently the Circuit Court of Appeals in Philadelphia in the Third Circuit, in another class of goods somewhat similar, to wit, tungsten metal (not ferrotungsten, but tungsten alloyed with iron), held differently on the proposition of what the term "metals unwrought" meant; and the Treasury Department determined to try a new case on the subject to secure what it thought was a reasonable rate of duty. In the trial of that case it sought special counsel, and it is because of my connection with the case that these people have asked me to appear here for them to make this explanation to the committee.

What we desire is that these ferroalloys shall receive a reasonable rate of duty, for the manufacturers assert that 20 per cent. is hardly enough to enable them to develop their industry here. If you consider giving 20 per cent. or 30 per cent. that will be agreeable to us.

Statement of John A. Topping of the Republic Iron & Steel Company.

John A. Topping of the Republic Iron & Steel Company, Pittsburgh, Pa., stated that he appeared before the committee as the representative of his own company and other independent manufacturers of iron and steel, not to advocate any change in the existing duties, but to ask sufficient time to investigate the subject properly. If these manufacturers found upon investigation that they could make any recommendations in the way of reductions they would be perfectly willing to do so if it could be done without abandoning the protective system. He admitted that a brief would be filed at a later date. Mr. Topping was briefly examined by several members of the committee, as follows:

Mr. Underwood: Do you ship any of your product to the Canadian market?

Mr. Topping: No, sir; we do not. I might say, in fuller reply to that question, that shortly after the first of the year I tried in every way to find a Canadian market for some of our bars, both iron and steel, but after an effort on the part of our sales department, who spent a week or 10 days investigating the conditions, they returned home with reports that were unfavorable to the effort and we abandoned it.

Mr. Underwood: Will you also state in the brief what your views are and what information you have as to the exportation? There was testimony here this morning as to exportations into the Canadian market. I would like to have your views with respect to exportations to the Canadian market.

Mr. Topping: I cannot explain the exportation to Canada, except on the ground that at the point of production—Pittsburgh, Cleveland or the Mahoning Valley, where we largely operate, or Chicago—with the advantages of quick service and special considerations of quality, the necessities of the buyers for quick deliveries might have justified purchasing on this side at a higher price than they could have bought on the other side of the water.

Mr. Underwood: I suppose, then, it is a conceded fact that the American manufacturer can compete in the Canadian market with the English manufacturer?

Mr. Topping: He cannot, in my opinion.

Mr. Underwood: But it is conceded that if he can he is producing on equal terms, because he goes into the Canadian market under a disadvantage.

Mr. Topping: If he had the same conditions of duty and the same cost of course he could.

Mr. Underwood: I want to ask you to address yourself to that question when you file your brief, if you will.

Mr. Topping: Yes, sir.

Mr. Cockran: Have you exported any steel to any foreign country?

Mr. Topping: No, sir; we have not.

Mr. Cockran: Have you any idea where the steel that is used in Mexico comes from?

Mr. Topping: I think that most of it, or a large part of it, or I will say the greater part of it, comes from continental Europe.

Mr. Cockran: A large part of it comes from America, does it not?

Mr. Topping: I think that a substantial tonnage comes from America.

Mr. Cockran: Mexico gives no advantage to American steel over that coming from abroad, does it?

Mr. Topping: No; but oftentimes sales are stimulated by sales of American machinery that call for the construction of a mill or a mine equipment, and that carries with it the suggestion of some steel bars or iron bars, and it saves time in transportation to have them all go in one parcel. For that reason, the saving of time being essential, they will pay frequently more for the American product in near-by countries like Mexico and Canada, rather than wait on a ship from England or Germany.

Mr. Cockran: Do you know anything about the sale of steel rails in Mexico?

Mr. Topping: I do not.

Mr. Hill: I want to know about this ferromanganese. We collected in duty last year from ferromanganese $378,000. Mr. Butler, one of the gentlemen who preceded you, said that it was only a question of changing the verbiage of paragraph 122, and that all that was requested was that it be put on the free list, and to leave pig iron and the other products on that list unchanged. What would be the effect of that?

Mr. Topping: The pig iron would not be affected, because the ferromanganese is used in the manufacture of steel as an alloy.

Mr. Hill: Would it reduce the cost of steel appreciably?

Mr. Topping: It would depend on the character of the steel you were making, as to the degree of carbon that you are trying to secure.

Mr. Hill: Would it reduce it 10 cents a ton?

Mr. Topping: I would not like to make any statement as to the average.

Mr. Hill: It would reduce it somewhat?

Mr. Topping: It would have that influence, naturally.

STEEL RAILS.

Statement of E. C. Felton of the Pennsylvania Steel Company.

E. C. Felton, president of the Pennsylvania Steel Company, who was the next witness, stated that he appeared in behalf of the steel rail manufacturers of the United States to say that the present rates in the Dingley tariff are fair, and that if any considerable reduction should be made it would work a hardship to the American producers, and would necessitate a reduction in wages, which is about the only element of cost which can now be changed. Mr. Felton's examination was conducted by several members of the committee, and was followed with the liveliest interest. It was in part as follows:

Mr. Felton: I am president of the Pennsylvania Steel Company. I represent that company directly, which has works in central Pennsylvania, and also on the Chesapeake Bay, near Baltimore. We are the only large producer of steel located on tidewater. Therefore, any change in the rates on steel rails and other steel products would affect us to a greater extent than it would any other manufacturer of steel in the United States. Now, I might take up half an hour, but I do not think I could state what I came here to say any more elaborately than that. We feel that the present duty is a proper duty, and we wish to ask that the committee allow the duty on steel rails to remain where it is to-day.

The Chairman: This committee will want a good deal more information than that on this question.

Mr. Felton: Well, I am here to give it to you, and I will give you detailed information as well as I can.

The Chairman: In 1907 we exported nearly $8,500,000 worth of steel rails, and we imported $133,000 worth. Nearly all of this came from Germany. We are exporting steel rails all the time. Mr. Carnegie, in the article which I quoted, says you can make them cheaper here than they can be made anywhere else in the world. Now we want a very full statement of every element of the cost of steel rails abroad, all stages of it; and every element of the cost in this country.

Mr. Felton: If you will tell me how I can get a statement of the cost abroad I would like to have it. It is impossible to get such a statement.

The Chairman: If you cannot get it, we shall get part of it.

Mr. Felton: I hope you can, and I want to assure you that any information we can give we are ready to give.

The Chairman: You can give a very full and complete statement of the cost here.

Mr. Felton: We can give you an absolute statement of the cost here. I do not know whether the committee know it, but the agents of the Bureau of Commerce and Labor

have spent more than a year and a half in going over our books. They have our detailed costs for 1902, 1903, 1904, 1905 and 1906—five years. They have those costs under a pledge of secrecy.

The Chairman: We want that reduced to the cost per ton of steel rails—the hours of labor, the cost of labor of different kinds, and all that sort of thing. We want to get the cost per ton of the labor and of the materials. Does your firm export any rails?

Mr. Felton: We have exported rails; yes.

The Chairman: In 1907 did you export rails?

Mr. Felton: Yes, sir.

The Chairman: Did you export rails at a profit when you exported them?

Mr. Felton: We exported rails at a profit in 1907, but not in some of the years previous.

The Chairman: When you exported rails did you have to pay a duty in the foreign country?

Mr. Felton: We have not exported rails into any country which levies a duty on steel rails except, possibly, Mexico.

The Chairman: What countries did you export to?

Mr. Felton: We have exported to Argentina and to Cuba. There is a duty in Cuba. We have exported to Mexico, and we previously exported to Siberia. We furnished a very large order to the Russian Government for laying the Trans-Siberian Railway. We have exported rails to Japan and to British India.

The Chairman: Did you export any to Canada?

Mr. Felton: Not within recent years. We have not exported any since the tariff regulations went into force in Canada.

The Chairman: Their tariff regulations are the same as ours, are they not?

Mr. Felton: I do not know just what the Canadian tariff is, because we have not been interested in sending anything in there. We were absolutely shut out by the duty.

The Chairman: As to these rails that you exported, of course you came into direct competition with Germany, England, &c.?

Mr, Felton: Yes, sir.

The Chairman: And you were able to meet them and sell the rails, and sell them at a profit?

Mr. Felton: I did not say that we always sold them at a profit.

The Chairman: You did in 1907 sell at a profit?

Mr. Felton: Yes, sir.

The Chairman: And in 1907 you met the same competition. What prices did you get for them in this country in 1907?

Mr. Felton: In 1907, for the rails which we sold in this country we obtained $28. For the rails which we sold in foreign countries we obtained $27.52. That was our price f.o.b. at the works at Sparrows Point, on the Chesapeake Bay, in both cases.

The Chairman: At that price you were able to meet the competition in the Argentine Republic and these other countries of Germany and Great Britain?

Mr. Felton: You must remember that 1905, 1906 and 1907, but especially 1907, were years when the foreign rails mills were exceedingly busy supplying their own home markets. Therefore, the price of rails naturally in their home markets was high, and the price of rails in the foreign markets in which we met them was exceedingly high. That is the reason we were able to obtain that price.

The Chairman: During the rest of that time how did the price in the foreign market compare with yours—during those years when that situation did not exist?

Mr. Felton: The price in the foreign producing countries was in every case, I think, higher than our price here—that is, the average price in England was over $28 a ton and the average price in Germany was up to $31 and $32 a ton.

The Chairman: I was speaking of those two or three years prior to that, when you did not export any.

Mr. Felton: We have exported in every year since back in the nineties. There was only one year, 1903, when we did not export.

The Chairman: During those years has the market abroad been lower than your price?

Mr. Felton: The market price in the countries to which we exported has been lower than our price. In 1900 there was a difference of $3.70. In 1901 there was a difference of $3.40. In 1902 there was a difference of $5.55. In 1903 we did not export any. In 1904 we only exported one order, where we got badly fooled by the wily Turk. We exported some rails to the Hejaz Railway. In that year the price was about $9 less than it was in this country. But that was an accident and a piece of bad management on the part of our agent in Constantinople. In 1905 the difference was $6.80, or something like that. In 1906 the difference was $4.50, and in 1907 (which, as I say, was an exceptional year, when the foreign mills were occupied with the demands of their own countries) the price rose in neutral markets so that we were able to obtain there $27—within 50 cents of the home price.

Mr. Cockran: Did any of these sales represent a loss to you?

Mr. Felton: Those sales represented in some years a book loss, but not an actual loss, for this reason: We can manufacture rails for export more cheaply than we can manufacture rails for delivery in the United States, because we use very largely imported iron ores, on which we obtain a rebate of the duty which we pay when the iron ore comes into this country. We also use very largely imported spiegeleisen, which is dutiable at $4 a ton. We obtain a rebate amounting to 99 per cent. of the duty paid when that comes into the country. So we are able really to produce rails for export more cheaply than we can produce rails for delivery in the United States. In a rough way, it takes off from $1 to $1.25 a ton. Then we also obtain an advantage by means of these orders—filling up our order books at times when we could not otherwise run steadily. We are enabled then to run our mills continuously, which in the manufacture of steel rails is a very considerable advantage. That is, in the manufacture of steel we take our our pig iron in the molten state directly from the blast furnace and it goes into the converting works, and so on through to the finished rail without ever losing its heat. If we slacken up and stop our converting mills then that pig iron, which would otherwise go through continuously in this operation, must be piled up cold. Then when we start up again it must be remelted at very considerable expense. That probably adds from 80 to 90 cents a ton to do that. So you can see that, if by acquiring these orders for rails in foreign markets we can run our works continuously, it incidentally means a cheaper cost of production for our whole product.

Mr, Cockran: You belong to the Maryland Steel Company, do you not?

Mr. Felton: We own the Maryland Steel Company.

Mr. Cockran: You are still exporting steel rails?

Mr. Felton: We are still exporting steel rails when we get a chance to do it.

Mr. Cockran: There is no competition that you are afraid of in a neutral market? If you are able to deliver rails in Argentina and in Siberia, that pretty nearly covers the whole extent of the globe.

Mr. Felton: Those rail deliveries in Siberia were made many years ago, when the cost of steel rails to us was very much less than it is to-day. In the 10 years for which I have figures the cost of steel rails to us has risen enormously. It has increased $7 or $8 a ton. That may seem extraordinary to you, but I think it perhaps explains some of the things in Mr. Carnegie's magazine article, which I have not seen. Mr. Carnegie was familiar with the steel trade in the United States in the late nineties. I do not think he has had anything to do directly with the steel trade of the United States since 1896 or 1897. In making his statement I think he was figuring on the cost of rails at that time. If he knew the increased cost, at least as shown by our cost books, he would not, I am sure, have made the statement he did.

Mr. Cockran: The increasing cost is largely due to the increase in the cost of the raw material, is it not?

Mr. Felton: Raw materials, freight and labor. If you will let me state it, I will tell you just what those costs are. Iron ores, which in 1898 cost us $2.15 to $2.25 a ton at lower lake ports, in 1907 cost us $4.75. The unit price which, after all, is the thing which determines the cost of ore going into a ton of the pig iron, cost us in 1898 $5.75—that is, the amount of iron ore necessary to make a ton of pig iron cost $5.75, and in 1907 it cost us $11.25. Then there have been advances in freight rates and on coke, and there have been advances in labor, so that the cost of steel rails has advanced during those years some $7.50 a ton, probably.

Mr. Cockran: The cost has not advanced any more in this country than in England and Germany, has it?

Mr. Felton: I wish I knew. I do not know. The only thing we have to guide us as to the cost of rails in foreign countries is their selling price. In Germany, as you know, the Government places a bounty on export rails. Now how much that bounty decreases their cost, and whether the price at which they sell in the foreign markets is anything like a legitimate price, I do not know. German rails are selling now f.o.b. Antwerp at something like $23 a ton, I think.

Mr. Griggs: Did you say Antwerp?

Mr. Felton: Yes, sir; that is that "Belgian nightmare." These are the latest advices I have. These came over to us from London.

Mr. Cockran: Surely you can tell us what the price of iron ore is in Germany, can you not?

Mr. Felton: I have not the slightest idea.

Mr. Cockran: You would not undertake to say that the price of iron ore or pig iron has advanced in this country in larger proportion than it has in Germany, would you?

Mr. Felton: Well, I should think it extremely likely the contrary was true, because I know from the price at which these rails are selling now that the home market has slackened up, and these foreign mills are now pushing their products out into the markets of the world.

Mr. Cockran: But notwithstanding all the advantages which the Germans have, you have been able up to this year

to maintain competition against them in neutral markets, have you not?

Mr. Felton: We have by making great sacrifices.

Mr. Cockran: These sacrifices did not involve a positive loss, I understand you to say?

Mr. Felton: In the 10 years our total export business showed a book loss of $1.49 per ton.

Mr. Cockran: Will you tell me in cash? Did that represent an actual payment by you for the privilege of selling your product, or did it result in a profit to you in cash?

Mr. Felton: I should say that we just about came out even on it.

Mr. Cockran: Now, can we rely on that?

Mr. Felton: I think you can. I have said it.

Mr. Cockran: That there was no positive loss. Very good. We can accept that as a definite and final statement that in competition with Germany, where they have this bounty, as you say, and in competition with England, Belgium, and all the rest of the world, in neutral markets, you were able to hold your own, without loss?

Mr. Felton: I think that is true; yes.

Mr. Cockran: You do not think you would have great trouble in holding your own in this country, where all the advantages are in your favor and where you have no freight to pay?

Mr. Felton: Of course we would when the demand in these producing countries slackens up. Remember these conditions in the last two or three years have been exceptional. We have all been so busy that we did not know what to do. Those conditions have changed. The Germans, the English and these Belgians also are now sending their rails out into the markets of the world. They send them out at a much lower price than they are willing to sell for in their own countries. That is especially true of Germany, where, as I say, the export of rails is encouraged by the Government by an indirect bounty.

Mr. Clark: Have you any connection with the Steel Trust? The United States Steel Corporation is the technical name for it, I understand.

Mr. Felton: Not at all.

Mr. Clark: You do not own any stock in it?

Mr. Felton: No, sir.

Mr. Clark: Do they fix prices in the United States or not?

Mr. Felton: They do not.

Mr. Clark: You are sure of that? Do you sell at the same price that they sell at?

Mr. Felton: We sell generally at the same price that they do. Let me explain to you exactly what is done in the rail business of the United States: The presidents of the rail mills have frequent conferences at which they discuss the question of a fair price to charge for steel rails. After that discussion we each one act as we think is best for our company. That has resulted largely in a price of $28, the price of steel rails having been quoted in a general way at $28. It does not mean that we sell all our rails at $28. That is, perhaps, what you want to know, is it?

Mr. Clark: You fix the jump, but you don't jump together—that is about it, is it not? You do everything now at one of these meetings that you can think of to do to try to avoid the law, and at the same time to come to an agreement?

Mr. Felton: We have nothing in the nature of an agreement at all.

Mr. Clark: You do all sell at the same price?

Mr. Felton: I don't know what the other mills sell at. I think they sell at $28.

Mr. Clark: You never inquire what the other people sell at?

Mr. Felton: I never inquired; it would not do any good.

Mr. Clark: You do not care what the other people sell for, I suppose?

Mr. Felton: I think they sell at that price, because I would find out when I come to quote prices to railroads if that price were cut to any considerable extent; that would develop.

Mr. Clark: You would be very much surprised, then, to find one of them getting $30 a ton, when you are only getting $28 a ton for your product?

Mr. Felton: I would be surprised, and I would think that our selling department was very lax if that was the case.

Mr. Clark: You would be very much surprised and chagrined—not chagrined, but surprised—if you found out that they were selling at $27 a ton and that you were selling for $28 a ton?

Mr. Felton: I would think in such a case, also, that we ought to find that out.

Mr. Clark: And yet they all sell, by accident, at the same price.

Mr. Felton: It is not by accident. I told you just exactly what was done in the steel rail trade.

Mr. Clark: How much is the company capitalized for?

Mr. Felton: The capital invested in works and in the business is just about $50,000,000.

Mr. Clark: How much dividend did you pay in 1907?

Mr. Felton: In 1907 we paid $1,155,000. Understand, that is not the capital stock of the company; that is the amount of money which is invested in the business. There is no water in it.

Mr. Clark: And you only got $1,000,000 profit in 1907?

Mr. Felton: I said we paid that to our stockholders. I did not say that was our profit. It was a poor year for us on account of the high prices for materials. Our income was $5,420,000. Deducting our bonded interest or interest on bonds, amounting to $748,000, left net earnings of $4,671,000, from which we charged off, depreciation, $1,572,000, leaving our net income $3,099,000. Out of that dividends of $1,155,000 were paid to our stockholders.

Mr. Clark: How much does the president of your company get for salary?

Mr. Felton: I do not believe I am called on to answer that question.

Mr. Clark: That is exactly what we want, whether you answer it or not. We want to arrive at how much profit you are making. Are you paying anybody any such price as president as the steel trust is paying Corey, $1,000,000 a year?

Mr. Felton: We are not; no.

Mr. Clark: The only fair way to find out what the profits are is to find out whether the salaries paid to those men do not swell up the expenses to such an extent that you make a poor showing as to your profits, when, as a matter of fact, there are a lot of fellows in the company who are becoming millionaires and multimillionaires.

Mr. Felton: Will you allow me to show you that? [Handing a memorandum on a slip of paper to Mr. Clark.] That is what the president is getting.

Mr. Cockran: I would like to see that, too.

Mr. Felton: Pass it around.

Mr. Clark (after examination of memorandum): Whew!

Mr. Longworth: Can you state what your net profits per ton were for the year 1907?

Mr. Felton: I have that right here, I think. Remember, I am speaking now simply of rails.

Mr. Longworth: The reason I ask that is that I saw in a copy of the *Wall Street Journal* for this year that the net earnings of the Steel Corporation for the year 1907 were $15.50 a ton. Were your earnings approximately the same?

Mr. Felton: We made a profit on rails. We have this one plant running on rails, you understand, and the percentage of profit on that one works is about the same as the general percentage of profit on all the works, but on rails our profits per net ton, before any depreciation is charged off, was $1.66 per ton. That was in 1907. In 1906 our profits were $3.28 a ton. In 1905 our profit was $3.71 a ton. You have heard all sorts of talk about the cost of steel rails. It is all based on figures that were made up in the late nineties when we were paying our men 10 cents an hour, and they were not working nine hours a day; when our rates on the railroad did not scarcely pay the cost, and when everybody that was selling us any supplies—iron ore or anything like that—was not getting back a new dollar for an old one. On that basis we made the steel awfully cheap. We were then able to make steel a great deal cheaper than anybody else in the world, we think. Since then prices have gone up, as I have tried to show you, until to-day—last year—those were the actual profits per ton which we made on steel rails at our Sparrows Point plant. When you compare the earnings of the United States Steel Corporation with the earnings of these smaller corporations, you must remember that the corporation owns all its raw material; you must remember that it owns the means of transporting those raw materials to its mills; that it owns the steamships and the cars; that it owns its supplies of fuel, and everything from the ground up that goes to make a ton of steel. Now, it is entitled to a profit on each one of those things; its money is invested in each and it ought to have a profit on it.

Mr. Hill: As I understood you at the beginning of your remarks, you stated that you came here to represent the entire steel industry?

Mr. Felton: I was asked to come here by the steel rail producers to say that they did not feel that under present conditions the duty of $7.84 a ton on steel rails is an excessive one.

Mr. Hill: The United States Steel Corporation, then, will not appear; is that it?

Mr. Felton: I do not know. I am pretty sure that it will not, because you know that your committee asked to have special individuals appointed to come here and talk to you on these separate schedules, and meetings were held at the offices of the American Iron and Steel Association, at which all the interests we could get together in the short time were represented.

Mr. Hill: Then, speaking for the whole trade, Mr. Felton, I would ask whether there is any international agreement between England, France, Germany, Belgium and the United States as to a distribution of the world's territory in the steel rail trade?

Mr. Felton: There is nothing that we are a party to.

Mr. Hill: Is there any to your knowledge?

Mr. Felton: To my belief there is a hard and fast association between the German, English, French and Belgian mills.

Mr. Hill: Not with the United States?

Mr. Felton: No, sir.

Mr. Hill: Pardon me if I read you just a sentence. I think it is from the *Wall Street Journal* of July 14, 1908, if I am not mistaken: "It is understood that some sort of an agreement bearing upon exports of steel has existed for several years between the United States and the lading iron producing countries of Europe. This agreement, it is said, has done a great deal to stimulate the foreign branch of the steel business and has resulted in great benefits to the companies concerned. There is also an understanding regarding the armor plate trade." To your knowledge, is there any truth whatever in that statement?

Mr. Felton: I know that that arrangement is in force, and I do know that we would like very much to be put in a position where we could join it.

Mr. Hill: Why?

Mr. Felton: Because it would protect the entire steel rail market of the world. We would get better prices. We would not cut one another's throats. We would save liabilities which exist now. You understand there is nothing to prevent the German or the English mills from subsidizing any one of their mills which is well located to simply flood this country with cheap steel rails and make up the difference in cost between them. We cannot oppose that sort of thing.

Mr. Griggs: We have been all theorizing over this question for about three hours. Do you know Mr. Andrew Carnegie?

Mr. Felton: Yes, sir.

Mr. Griggs: Pretty rich, is he not?

Mr. Felton: He is said to be.

Mr. Griggs: Do you know Judge Gary?

Mr. Felton: I do.

Mr. Griggs: He is pretty well off, is he not?

Mr. Felton: I do not know.

Mr. Griggs: Do you know Mr. Schwab?

Mr. Felton: Yes, sir.

Mr. Griggs: He is pretty well off?

Mr. Felton: I do not think he is as well off as he was at one time.

Mr. Griggs: Do you know Mr. King, who was here this morning?

Mr. Felton: Yes, sir.

Mr. Griggs: He is pretty well off?

Mr. Felton: I do not know.

Mr. Griggs: Do you know of a poor man in the steel business?

Mr. Felton: I do.

Mr. Griggs: Where is he?

Mr. Felton: Right here—I am he.

Mr. Griggs: That is why they sent you. You are the only one.

Mr. Felton: I do not think I am the only one.

Mr. Griggs: Do you know of any more.

Mr. Felton: I do not think that has much to do with this question before the committee at this time.

Mr. Griggs: Are you the gentleman drawing this modest salary you handed up here to the committee this afternoon?

Mr. Felton: I handed Mr. Clark a memorandum of what my salary was.

Mr. Griggs: And you began in the chemical office of the steel mills and you went up through the mills to the presidency of this Pennsylvania Steel Company?

Mr. Felton: I did.

Mr. Griggs: You own no stock in it?

Mr. Felton: I own 550 shares.

Mr. Longworth: How many other corporations make the same product you do, outside the United States Steel Corporation?

Mr. Felton: Rails? There are the Colorado Fuel & Iron Company, the Lackawanna Company, the Cambria Steel Company, the Bethlehem Steel Company. Mr. Topping's company also makes rails.

Mr. Longworth: Generally, with whom are you in competition?

Mr. Felton: In construction steel, with the Lackawanna—that is, the Lackawanna, ourselves, the Cambria Steel Company, the Bethlehem Steel Company, and some mills in Chicago are in competition. There are quite a number of mills in all lines. Jones & Laughlin are the largest manufacturers of structural steel outside of the United States Steel Corporation, and there are others.

Mr. Longworth: In your opinion, does your average yearly profit substantially approximate the average yearly profit of other corporations outside of the United States Steel Corporation?

Mr. Felton: I think so. The concerns in the Pittsburgh District have a great advantage over us in the cost of fuel. They also have advantage over us in the cost of iron ores from the lakes, but we have the advantage of foreign imported ore, and I do not think they can vary very widely. Of course, they do vary some. The situation has a great deal to do with it.

Mr. Longworth: You think, then, that the United States Steel Corporation's average profit per ton is greater than that of the independent companies?

Mr. Felton: As shown by its annual reports it certainly is; but remember that all these figures are due to its owning its ore and transporting ore by water and rail, and the production of coke, and limestone, and everything going into the manufacture of steel, on which it gets profit all the way up.

In reply to other questions by members of the committee, Mr. Felton presented some figures taken from recent annual reports of his company, figures with which the readers of *The Iron Age* are already familiar. Mr. Felton emphasized the fact that in the organization of his company the only "water" injected therein was a relatively small proportion of common stock upon which no dividends have ever been paid.

TIN PLATE AND SHEETS.

Statement of William U. Follansbee, of the Follansbee Brothers Company, Pittsburgh, Pa.

Mr. Follansbee: I am to speak on paragraph 134, tin plate, and incidentally 131 and 132 as being a kindred product made by the same plant. I am glad, in speaking of the tin plate proposition, we can say it is not now an infant industry. It is, however, the youngest of all the iron or steel products. It is also important to bear in mind that tin plate is an item that has by far the largest labor cost. I am here to-day representing 12 independent tin plate plants that are located in several different States, widely scattered. I believe I am entirely justified in saying these independent plants, while they are making tin plate, are also making money.

Mr. Fordney: Good.

Mr. Follansbee: We are capitalized in an aggregate of $10,000,000. These tin plants have an aggregate of about 103 mills. These tin plants have an annual capacity of about 300,000 tons, which is equivalent to about 6,000,000 base boxes. They employ in the aggregate about 7000 hands. Their annual pay roll is about $5,000,000. Taking the tin plate industry in an entirety, the entire production in this country is about 600,000 tons, equivalent to 12,000,000 base boxes of coated product. These same mills turn out a large tonnage of the same material, which, however, is not coated. The industry of itself, tin plate manufacturing, employs about 20,000 hands and pays annually in wages about $13,000,000.

In speaking of the tin plate industry itself, it is only proper to remind you of the fact that tin plate has been the football of the tariff. The act of 1871 undoubtedly was intended to be highly protective. In that act was written a duty of 2½ cents per pound. Under it two mills started the manufacture of tin plate. After the establishment of those two mills and after they became operative, the foreign manufacturers, through the New York importers, very greatly reduced the prices. The competition was very severe, and in some way which I can hardly understand a decision or interpretation or construction of the law was rendered by Secretary Fessenden whereby he inserted in the act a comma which did not belong there. The act read, "Tin plate or iron, galvanized, shall pay 2½ cents per pound duty." The comma was inserted by Secretary Fessenden, which made it read in effect, "Tin plate galvanized, or iron galvanized." On the face of it, it was an insertion. It was ridiculous, putting two coatings on one black sheet. Nevertheless, under that ruling, instead of 2½ cents per pound, they were assessed at 15 per cent. ad valorem, with the result that one of these mills that was in operation went into bankruptcy and the other struggled along for a few years and eventually turned to another line of business.

The act of 1883 called for a revenue tariff of 1 cent a pound, under which no tin plate was made in this country, except that one of the plants which I mentioned made a desperate effort for a short time, but had to give it up as entirely unsuccessful.

The McKinley Tariff in 1891 called for a duty of 2.2 cents per pound. That was sufficiently protective to justify capital entering into the business and learning. The industry was getting on its feet when the Wilson bill came along in 1894, with a duty of 1.2 cents, and knocked the industry to its knees. The result was that the mills closed for a considerable period and a most bitter labor conflict ensued. That lasted for a period of about six months, and finally, to get work and start the mills the laboring men took a very severe reduction. That condition existed practically until 1897, when the Dingley bill put on a new tariff of 1½ cents a pound. That was sufficient at the time. The mills which started following the passage of the McKinley law had received lower wages. They had gained in experience. Some of them, true, had failed and had been purchased at sacrifice prices by others, but nevertheless the industry continued satisfactorily up to the present time under the Dingley tariff of 1½ cents per pound.

When the McKinley bill was passed Wales was sending to this country, in round numbers, 300,000 tons of tin plate. The industry to-day, as I have already said, totals about 600,000 tons, having doubled. To this can be added fully an additional 100,000 tons of black product, made by the same mills. To produce the 600,000 tons of coated products, the following is necessary: 1,400,000 tons of ore, 850,000 tons of coke, 400,000 tons of limestone, 750,000 tons of pig iron, 700,000 tons of steel, paying to American wage earners approximately $20,500,000 in wages. Of this very large sum is directly paid in the tin plate line, which is protected, $13,000,000, in round numbers—I figure it at $12,800,000—out of the $20,500,000.

I am glad, so far as the tin plate industry at least is concerned, that the tariff does not advance the price. The average price of tin plate under the 15 per cent. ad valorem duty of the act of 1871, from the years 1872 to 1878, in United States currency, was $6.35, f.o.b. Swansea, Wales. Irrespective of the freight and other small charges, add simply the 15 per cent. ad valorem duty, and that means for the seven years from 1872 to 1878, America was paying an average of $7.30 for its tin plate.

During the period of 1879 to 1891, when the McKinley bill became effective, under which we had a revenue duty of 1 cent per pound, the average price f.o.b. Swansea, Wales, in United States currency, was $3.81 plus the duty, making a total of $4.81, which America was paying for its tin plate during that period.

For the last five years the average price in this country has been $3.48, showing conclusively that the whole competition has tremendously reduced the cost to the American consumer.

As regards the present duty and prospective duty, the American tin plate manufacturer is only 17 years old. He is the youngest in all the iron or steel industries. The price to-day of Welsh plates is 12 shillings per box, f.o.b. Swansea, Wales. That is an open quotation, but I believe I can buy them for less; but we will use that for an illustration. At the rate of $4.86 per pound sterling, that is equivalent to $2.92, from which there is a discount given by the Welsh manufacturer of 4 per cent., making the price to-day of the Welsh plate $2.84, f.o.b. Swansea, Wales.

Without going into details, you can easily see that a freight of 9 shillings 6 pence or 10 shillings, plus a commission for selling, $2.80, f.o.b. Swansea, Wales, will very readily place the plate at the American seaboard at a cost of $3 without duty.

A peculiarity of the tin plate business is the fact that fully two-thirds of it is consumed at the seaboard—New York, Philadelphia, Baltimore, New Orleans and San Francisco. As regards the consumption in San Francisco or on the coast—not limited entirely to San Francisco, but the other coast cities—the consumption is seasonable. It is not regular throughout the year. It is easy enough for the consumers to anticipate by months their requirements. The American manufacturer must sell his goods delivered at the seaboard. From the mills in the Pittsburgh District a freight rate of 18 cents and a shipping rate of 106 lb. exist, the railroads exacting a tariff on the package as well as the contents, making the cost to deliver in New York City 19 cents per box or per 100 lb. To deliver it to New Orleans costs 34 cents. To deliver it to San Francisco costs 70 cents, so far as the American manufacturer is concerned. The facts are, as regards the Welsh manufacturer, selling even to the more distant point of San Francisco for seasonable trade, his plates can be loaded at Swansea, Wales, and carried as ballast, and be delivered at practically as low cost as in New York City. We accordingly have the proposition that the Welsh manufacturer, exclusive of duty, can lay his plates down at the seaboard at $3 per box. If we deduct our 70 cents freight to the coast, the American manufacturer, exclusive of duty, would be compelled to sell his plates f.o.b. the mills at $2.30 per box of 100 pounds.

The market quotation to-day for this character of tin plate is $3.65, or a difference of $1.35. The duty is $1.50. It protects.

The independent tin plate manufacturers, in considering this question of tariff, felt if any were justified in standing pat they would be. They have, however, endeavored to look at this in rather a broader light and have recognized a sentiment in the country toward tariff revision downward; and in giving this most earnest consideration, the tin plate manufacturers are willing to say to you gentlemen of the committee that we will struggle along, and we believe we will continue to make some money, if the tariff is revised by reducing it 20 per cent., which will take it from $1.50 to $1.20. It will then be identical with the Wilson bill of 1894; and the only difficulty about the Wilson bill was that it was 14 years ahead of time. That is the recommendation we are prepared to make, and I think we will put that in our brief, which we will give to you at some later date.

I had no intention of speaking on sheets, but the tin mill products are influenced. The tariff on sheets reads as follows: "Sheets of iron or steel, common or black, of whatever dimensions."

Tin plate is steel sheet coated with tin. The mills make thn sheets of many dimensions. It was not intended to look this matter up and I have not gone into the statistics as I have for the coated products, but I can say this, that as regards the lighter gauges the tin plate manufacturer will accept and, I believe, will continue to run his mill by taking the same number of tenths reduced duty. I think, however, to make a very decided distinction, the matter of heavy gauges should be looked into. I have not looked into heavy gauges, and it may be possible that would not be applicable there.

Mr. Clark: Do you represent all of the tin factories in the United States?

Mr. Follansbee: I am representing to-day the 12 independents. We call ourselves independent because we are not mmbers of the United States Steel Corporation.

Mr. Clark: That is what I wanted to get at. There is no use asking any questions about the United States Steel Corporation?

Mr. Follansbee: I do not know.

Mr. Clark: Nobody else does, so it seems. What I want to know is this: On this $10,000,000 of capital, which I understand you to say you have, what per cent. of profit did you make in 1907, for instance?

Mr. Follansbee: I can say that I believe the independent tin plate plants of this country during the last three and four years have been making profits running from about 8 to 12 per cent.

Mr. Clark: Now, you think if it is cut down to the basis of the Wilson bill you can still work and live and flourish?

Mr. Follansbee: I am saying so.

Mr. Clark: Suppose we cut it down to 1 cent, in the exigencies of having to get some money to run the Government, do you suppose you could still make a profit?

Mr. Follansbee: Under certain circumstances, by reducing labor.

Mr. Clark: That is the only way, is it?

Mr. Follansbee: Provided other conditions remain as they are. You know that was exactly the situation when the Wilson bill passed. It is a question of history. Mr. Dalzell knows that.

Mr. Clark: Mr. Dalzell was very largely engaged in making the Wilson bill, and I was not. He was one of the architects of that bill, and I was not.

Mr. Follansbee: It was only 14 years ahead of time.

Mr. Clark: That is the way with most good things. If the price of steel should go down, that of course would help you?

Mr. Follansbee: Naturally.

Mr. Clark: Do we make as good tin in the United States as they make in Wales?

Mr. Follansbee: I do.

Mr. Clark: I am glad to hear it, because it is frequently stated and currently believed that the American tin is not as good as the foreign tin. Of course I do not pretend to know a thing about it, but if it is as good I am really glad to hear it.

Mr. Follansbee: You can tell them now you know better. I have heard it so often, just as Mr. Clark stated, that I want to state here before all the gentlemen of this committee that if any of you want to put on a tin roof, Follansbee Brothers Company will sell that plate and will back it by their capital of $1,000,000 and guarantee it on your house for 15 years. Did you ever know a Welshman to do that?

PIG IRON.

Statement of J. A. Shimer of the Dunbar Furnace Company, Philadelphia, Pa.

J. A. Shimer of the Dunbar Furnace Company, Philadelphia, Pa., addressed the committee on behalf of Eastern pig iron producers, stating that he believed the industry should still have the protection of $4 per ton on pig iron provided by the Dingley act. Mr. Shimer's examination was in part as follows:

Mr. Shimer: I represent the oldest furnace and the first furnace to make pig iron in the United States west of the Allegheny Mountains. It is located at Dunbar, Pa. At the time of the last change in the tariff under the Dingley act I represented the Eastern Pig Iron Association. I said at that time, with regard to the duty of $4 a ton that was imposed under great opposition from the pig iron people under the Wilson act, that we ought to have some protection at that time, because really $4 a ton protection does less under the Dingley act than it did under the Wilson act, and that is the case only to a greater extent to-day than it was then. In other words, $4 is less protection to the trade to-day than it was when the Dingley act was passed, for the reason that all ores or practically all ores that came to the furnace for the past 14 years have been gradually receding in metallic contents, and if you want to protect it $4 a ton on pig iron, with an ore worth 40 cents a ton duty with less metallic contents than it was before, you would be giving less protection to the manufacturer, and what I wish and what I claim is that we still should have the protection of $4 on pig iron. If parties in Phila-

delphia, New York, Boston or Baltimore want to take advantage of the export it is all free to them, excepting the cost of weighing the iron—1 per cent.—just as free as it could be if there was no duty on it. Such concerns as R. D. Wood & Co. and the Maryland Steel Company and others situated on the seaboard pay no duty on any iron ore production on the iron they want to ship abroad, and if they do pay it they only pay it temporarily, and they get 99 per cent. of it back. If the German Rhine iron, costing to-day or costing last year in the neighborhood of $13.46 per ton, f.o.b. on the upper Rhine, and with a German subsidy of a freight rate on the Mercantile Steamship Company of something like $1.50 a ton to New York or Philadelphia, making $13.36 plus $1.50, or about $16 plus the duty, put it on the wharves at Philadelphia—that is, a No. 2 iron—why should we in eastern Pennsylvania worry about the importation of pig iron when that is the case? We ought not to be worried with it. We do not make much money on the pig iron that is made—that is, much profit, very little profit. It is very seldom that you can make much profit. To-day you cannot make a cent. Last year you could not run at a profit; you could run, but you did not know whether you were going to get a profit or not.

Mr. Boutell: If we should repeal the duty on iron ore, would that make any difference in the duty?

Mr. Shimer: We would not change the duty on pig iron. The benefits that have accrued on iron ore and on the iron here have been by the sale of the material out of this country, and we do not want to repeal it if it is used here.

Mr. Clark: Then what do you want the tariff retained on iron ore for?

Mr. Shimer: Simply for the benefit of the trade in general it should be retained.

Mr. Clark: Do you think you would have plenty to do to look out for your own particular phase of the trade?

Mr. Shimer: The Pennsylvania iron ores we used up until the discovery of the ore up in the lakes. We have some 8000 acres of ore land carrying 33, 34 and 35 per cent. iron that it is impossible to-day to smelt.

Mr. Clark: Now, really, when Mr. Boutell asked you if we should take the duty off of iron ore if it would not help you to manufacture the pig iron, you harked back then in your mind to the fact that you also own iron lands?

Mr. Shimer: Not available at the present time.

Mr. Clark: I know; but you ought to make them available.

Mr. Shimer: No, sir; they would not be available with $1 a ton duty on them.

Mr. Clark: Then why do you want the tariff on iron ore kept on?

Mr. Shimer: Because they would be less available if it was taken off.

Mr. Clark: How much have you got invested in this business, if I may inquire?

Mr. Shimer: Something like $4,000,000.

Mr. Clark: How long have you been at it?

Mr. Shimer: Something like 35 years.

Mr. Clark: Did you make $4,000,000 out of the iron business?

Mr. Shimer: No, sir.

Mr. Clark: Did you inherit it?

Mr. Shimer: No, sir.

Mr. Clark: Where did you get it?

Mr. Shimer: I made part of it out of farming.

Mr. Clark: I will withdraw that question. Do you know anybody who is farming who is worth $4,000,000?

Mr. Shimer: No, sir. I am not worth $4,000,000 either.

Mr. Clark: As a matter of fact, do you know that there is only one farmer in the United States who is worth $1,000,000, and he lives in Missouri?

Mr. Shimer: It does not make any difference. I am worth a part of a million dollars, and I have farmed and I have made part of a million out of farms.

Mr. Clark: Now, how much profit in a year did you make out of the iron business.

Mr. Shimer: About $150,000 net on $4,000,000 of value.

Mr. Clark: That is all the iron business pays, is it?

Mr. Shimer: That is all the independent iron business pays at the present time. When you buy your lake ore and make your coke, it takes every solitary cent that you can possibly save to pay the current present rate of labor and keep running.

Mr. Clark: How much do they pay the president of your company?

Mr. Shimer: I think he gets something like $100 a month. We pay the manager a little more than that. He receives $6000 a year.

Mr. Clark: Is that the highest priced officer in the company?

Mr. Shimer: That is the highest priced officer in the bunch.

Mr. Clark: Now, these steel men expect people to believe statements that none of them are making over 3 or 4 or 5 per cent.?

Mr. Shimer: I think you ought to believe them from what they think.

Mr. Clark: But there is such a thing as appearances, and the reputed fortunes that they have and the acknowledged fortunes that they have do not correspond.

Mr. Shimer: But it is largely on paper.

Mr. Clark: Andrew Carnegie could not have made $500,000,000 if he had lived until he was as old as Methuselah?

Mr. Shimer: Unless he had sold out.

Mr. Clark: He did not have to sell out to have two or three millions?

Mr. Shimer: I do not know whether he did or not; I cannot tell you about that, but unless he had sold out he would never had made anything in the steel or iron business. You can never make anything in the iron business until you sell out.

Mr. Clark: How did Frick make his money, did he sell out?

Mr. Shimer: Yes, sir.

Mr. Clark: How did Carnegie happen to get $1,000,000 in salary?

Mr. Shimer: They gave it to him.

Mr. Clark: And Schwab?

Mr. Shimer: That is another matter.

Mr. Clark: If they can afford to pay such salaries they are making money?

Mr. Shimer: Undoubtedly they are.

Mr. Clark: You cannot afford to pay it out of dividends of 3 or 4 per cent.

Mr. Shimer: No, sir; but they can buy ore lands, which is a sort of unearned increment.

The Chairman: That is the way you get at it?

Mr. Shimer: Yes, sir.

The Chairman: And that is the way you got the $4,000,000 invested?

Mr. Shimer: Yes, sir.

The Chairman: And the money you invested in the business brought it up to $4,000,000, did it not?

Mr. Shimer: Yes, sir.

TUBES AND WIRE.

Statement of J. A. Campbell, of the Youngstown Sheet & Tube Company.

Mr. Campbell: I was called to a meeting in New York day before yesterday and was selected to come here and represent the pipe interests, the wrought iron pipe intersts.

Mr. Underwood: Will you please give us the number on the schedule?

Mr. Campbell: It is 152. The schedule calls for 2 cents per pound on "lap welded, butt welded, seamed or jointed iron or steel boiler tubes, pipes, flues, or stays, not thinner than No. 16 wire gauge." That, I would take it, was $40 a ton, and I suppose I will occupy the unique position of being the one fellow who says that this tariff is too high. I am a tariff reformer, I presume, but I am a protectionist.

Mr. Griggs: I am glad to see that you are honest with respect to that.

Mr. Campbell: And I have argued to all these people, as a good many others have, that we ought to come here and be honest and say what we think, and that when the tariff is too high that we ought to be willing to accept a reduction, and when it is too low we ought to ask for an advance. I understand there is to be a reduction of the tariff, but there have been a great many inaccuracies that have crept into the tariff because it probably has been a matter of grace. You gentlement are Congressmen representing different districts, and they all do not think alike, but their districts generally think as they do or as some other district thinks.

The Chairman: What do you think this duty ought to be, as an honest, square duty?

Mr. Campbell: It ought not to be half what it is in this bill. It is, say, $40 a ton; it ought not to be over $20. That is a cent a pound, which would be ample duty to protect us. Now, I cannot speak for every other manufacturer.

The Chairman: How would $10 do in your business?

Mr. Campbell: Well, $10 would not do ordinarily; but we possibly could get along with a dollar or two less than somebody else. I think our costs are as low as anybody else's costs, outside of the United States Steel Corporation.

The Chairman: What could you get along with?

Mr. Campbell: We could possibly get along with $18 instead of $20 a ton.

Mr. Griggs: Let us compromise on $15 now and quit.

Mr. Campbell: No, sir. We want you to remember now, speaking seriously, that you are legislating for a lot of people. I know of a number of mills throughout the East and throughout the Middle West that make pipe and that cannot make pipe within $4 or $5 a ton as cheap as we can, and if you put this tariff so low you will either force them to put their men to a small wage or put them out of the business. In 1906 two of the largest and best mills in this country went out of business on account of the prices, and we lost money on all the small sizes of pipe which we made during that year.

Mr. Underwood: When we get a witness before us who is candid and square, as you are, I think the committee can very well rely upon his judgment. I would like to ask

you if you will give the information for the committee, ascertain the cost of this pipe in the competitive markets abroad, what it is selling for there, and ascertain the freight rates to New York City?

Mr. Campbell: I expect to do that.

Mr. Griggs: If you will refer to paragraph 152, you will notice that it says 2 cents a pound on "lap welded, butt welded, seamed, or jointed iron or steel boiler tubes, pipes, flues, or staye, not thinner than No. 16 wire gauge, 2 cents per pound; welded cylindrical furnaces, made from plate metal, 2½ cents per pound."

Mr. Campbell: I do not know anything about that; we do not make that and I cannot speak as to it, but I do not think you ought to treat that in the same way that you have treated the pipe, from my general knowledge of it, but I really do not know anything about it—that is, I do not think it would be fair to cut that in two because it was in paragraph 152.

Mr. Griggs: But you think we ought to go in for a general tariff revision, do you not?

Mr. Campbell: Yes, sir; but bear in mind all the time that this duty ought to be a protective duty, not so high, however, at any time that no material can come into this country, because if you do that it would permit us as manufacturers to get together, if it was legal for us to get together—which it is not—in some way when the demand was greater than the supply, which was true last year, when we could have put the pipe up $4 or $6 or $8 a ton, and the people would have had to pay. It would not have been fair. We could have done that under this tariff, but it would not have been fair. It did not occur, but it might occur at some time, and I do not think that it ought to occur. There is one other item that I want to speak of, and that is with reference to a subject that another gentleman was billed to speak on, Mr. Roebling, on wire. Mr. Roebling is not here. It is 137, "Round iron or steel wire, not smaller than No. 13 wire gauge, 1¼ cents per pound." I have recently gone into the wire business—that is, the 16th of last March I bought a wire plant.

I have not been in the business long enough to know from my own personal knowledge what this tariff ought to be. From my own personal experience in the last few months it does not cut any figure and should have no weight with you. I should say that this tariff was not ample, but when I come to compare it with other things I would say that it was too high. Our business does not show, in the wire end of it, or has not shown a justifiable profit. Our other business has been a profitable business. That is another thing; you have accused everybody of saying that they have not made any money. We have made money for the past four years; our business has been very prosperous, and I believe in talking with these people about this wire, that they will be perfectly satisfied if this is reduced the same. Perhaps wire requires about as much labor as any or perhaps more than any other one item, being in about the same class as pipe. Now, with reference to wire nails, wire nails have only ½ cent a pound. and I know that we cannot afford to have that reduced. We are selling wire nails now very cheap, and in looking this matter up on the train coming here yesterday we found that they could lay nails down cheaper in New York than we could make them. That protection, I think, is ample, but I do not think it is too much. I think that you can afford to take off three-tenths of a cent a pound without hurting either labor or capital invested in the wire business, and I believe it would be perfectly satisfactory.

But in all these things you want to remember that there are hundreds and hundreds of small concerns that are making sheets and buy their bars, and do not produce them as we produce them and as the corporation produces them. There are hundreds of concerns that are buying the rods and putting them into wire, and then into the other forms of production. Some go back farther and buy the billets and have their own rod mill. We produce this stuff from the ore to the finished product, and what might be satisfactory to us and what we might live under, might put them out of business. So that you want to be careful in framing all these bills, in my opinion, and take into consideration the vast number of smaller manufacturers who have the same right to live as the larger ones have. For instance, the Steel Corporation could put us out of business if it saw fit at any time because we are not doing a powerful business, while we have a vast advantage over a number of other people because our firm is new and our facilities are first class. We can manufacture the stuff as cheap after we get a start as anybody, we believe, not even excepting the corporation, but we cannot bring ore down, we cannot mine it and bring it down because we have no transportation facilities to handle it in that way nearly as cheap as the corporation can.

The Chairman: You suggest a reduction, as I understand you, of 3-10 cent a pound?

Mr. Campbell: Yes, sir.

The Chairman: Now, "Round iron or steel wire, not more than No. 13 wire gauge, 1¼ cents per pound." You make that ninety-five one-hundredths, do you?

Mr. Campbell: I would make that about 1 cent a pound and the other about 1.20.

The Chairman: "Smaller than No. 13 and not smaller than No. 16 wire gauge, 1½ cents a pound?"

Mr. Campbell: That ought to be about 1.20.

The Chairman: Smaller than No. 16 wire gauge, 2 cents a pound?"

Mr. Campbell: That could be safely three-tenths off; in my opinion that could be reduced that much.

Mr. Randall: If the tariff was taken off of steel products entirely in this country, would that not very much reduce the price of building, building material and railroad building and everything of that sort?

Mr. Campbell: I do not think it would much.

Mr. Randall: It would not reduce the price?

Mr. Campbell: It might some.

Mr. Randall: If it would not reduce the price, you could go ahead and manufacture and sell the same as you are now?

Mr. Campbell: If all those things are going to be on a lower basis they have all got to come together—labor and material and transportation and everything that enters into cost.

Mr. Randall: Would that not make the material cheaper?

Mr. Campbell: It might possibly. I think it would have a good effect on the whole country if you did it on all the different things. If you took it off of barbed wire, however, it would not, because there would be enough other things to employ labor and the laborer would say he would not work in the barbed wire business but would go into some other line of business.

Mr. Randall: You think it would be better, then, if the tariff was reduced so as to let the stilted business down on a natural level?

Mr. Campbell: Yes, sir, everything that is stilted; but I do not want you to understand that I say that it is. There is no instance that I know of where the prices are higher now than they would be if the tariff was reduced, except in this general leveling down of everything that would come if the tariff was taken off.

CRUCIBLE STEEL.

Statement of William G. Park of the Crucible Steel Company of America, Pittsburgh, Pa.

William G. Park, who was the next witness, said that he was prepared to recommend a reduction in the duty on certain articles embraced in paragraph 135, covering steel ingots, cogged ingots, blooms and slabs.

Mr. Park: The volume of this business in which I am interested, as covered in this clause, is about 300,000 or 400,000 tons a year, and it is a class of steel that is higher in price and superior in quality to the ordinary steel, called bar steel. We think that the duty permits of pretty large importations at the time; there is a great deal of it imported, and I do not think we can stand a very large reduction in the tariff without having the importations increased. But recognizing the fact that a reduction perhaps is in order, we would ask the committee to make it as light as possible. We feel prepared to stand something of a reduction in respect to it. I have talked to several manufacturers in this line of business and they think that about 10 per cent. from the present duty would be something that would be acceptable. Then there is a great deal of steel that is made—that has only been made about five years—called high speed steel, for which there is no protection in this Dingley Tariff act. We propose a scale. The highest here is 16-cent steel, bearing 4.7 cents a pound duty. We propose 20-cent steel, steel 20 cents a pound and not over 25 cents, 7 cents a pound; 25 cents and not over 30 cents, 10 cents; 30 cents and 36 cents, 15 cents; 36 cents a pound and over, 20 cents. The article that enters into the manufacture of that steel largely is metallic tungsten, which sells for 75 cents a pound, so you can readily see that we have a good reason for asking this.

Mr. Bonynge: Where do you get that tungsten from?

Mr. Park: We get it from a manufacturing concern in York, Pa.

Mr. Bonynge: Where does the tungsten ore come from?

Mr. Park: The tungsten ore comes from Spain, Chile and Germany.

Mr. Bonynge: Don't you use any from Colorado?

Mr. Park: From Colorado, yes, sir; I suppose that probably from one-fifth to one-tenth of all that is mined is from Colorado, and some from Spain.

Mr. Griggs: How much of this did you manufacture in the last year.

Mr. Park: I do not suppose the amount manufactured by our company was more than a half million dollars' worth of steel.

Mr. Griggs: What is the name of the steel?

Mr. Park: It is tool steel, called high speed tool steel.

Mr. Griggs: Do you know what the importations were last year?

Mr. Park: I do not know what the importations were, but I think the importations of all of this class of steel that we manufacture is about $4,000,000 or $5,000,000.

Mr. Underwood: I want to ask you this question: I see that there is considerable importations of ingots, blooms, and slabs and steel bars. I suppose the cheapest point where this can be imported by this country would be New York, because the freight rates are cheaper there from foreign ports.

Mr. Park: Yes, sir; almost all in New York.

Mr. Underwood: What is the importing price of blooms after the duty is added, or without the duty, if you can give it to me in that way?

Mr. Park: What grade of blooms do you mean? If you mean the cheap grade of blooms, such as the steel rail quality, I suppose it would be about $18 a ton.

Mr. Bonynge: Let me ask you a question for information. Can you get tungsten here from Spain and Chile cheaper than the Colorado tungsten?

Mr. Park: We have never tried to buy tungsten.

Mr. Bonynge: Tungsten ore, I mean. Can you get the ore from Spain and Chile cheaper than you can from Colorado here?

Mr. Park: I think it would be about the same.

BARS AND BAR PRODUCTS.

Statement of James Lord, of the American Iron & Steel Mfg. Company, Lebanon, Pa.

James Lord told the committee that he had discussed the subject of the tariff on bars with the principal Western interests and with some of the Eastern interests, and that he was authorized to say that they would be content with a reduction of one-tenth the present duty on bars. His examination was in part as follows:

Mr. Lord: I was authorized to say for the interests that I have consulted, being the principal Western interests and some of the Eastern interests, that they are willing to have a reduction in the price of iron bars of 1-10 cent. That would make it five-tenths.

Mr. Underwood: There is no bar iron being imported into this country at all now, is there?

Mr. Lord: The only bar iron that I know of being imported is a very high grade of staybolt iron.

Mr. Underwood: That is not really in competition.

Mr. Lord: That is not competitive.

Mr. Underwood: How much is the production of this bar iron in the United States at this time?

Mr. Lord: As near as I can ascertain, it is about 1,250,000 tons.

Mr. Underwood: What is the cost of producing this bar in this country?

Mr. Lord: Well, the present profit on bar iron is about $1 a ton; sometimes it is not that.

Mr. Underwood: What is the selling price?

Mr. Lord: The selling price at the present time is about $28 a net ton.

Mr. Underwood: Twenty-eight dollars, and the cost is $27?

Mr. Lord: It costs about $27, the ordinary machine bar iron.

Mr. Underwood: What is the principal market abroad in which this iron is produced, the principal foreign market, England?

Mr. Lord: England and Germany.

Mr. Underwood: What is the selling price in the markets of England to-day?

Mr. Lord: I am not acquainted with those prices.

Mr. Underwood: Can you get those prices and furnish them to the committee?

Mr. Lord: They are in the trade papers, and I could get them.

Mr. Underwood: It may save us some trouble. In other words, we have access to that information ourselves and we will probably look it up, but we may come to a different conclusion from yourself as to foreign iron, and it will be well for you to file your conclusions as to what is the price of the foreign market and the freight rates of this country. I suggest that you give us your view as to what is the selling price.

Mr. Lord: I will be very glad to do so. I will obtain the figures.

Mr. Hill: The reduction of 1-10 cent a pound, which you say will be satisfactory, I suppose is based on the same continued duty on ore, &c., beforehand. If the proposed reductions were made, you would not object to a corresponding reduction?

Mr. Lord: That was considered in coming to this conclusion. I also wish to speak with reference to paragraph 145, and with respect to that portion of the paragraph that refers to bolts and not to hinges, and also to paragraph 163 and that portion of it which refers to spikes, nuts and washers, and not to horse or mule shoes; also, with respect to paragraph 167, on the subject of rivets.

On bolts, the present tariff is 1½ cents a pound; on spikes, nuts and washers, 1 cent a pound; on rivets, 2 cents a pound. I wish to call the attention of the committee to the fact that there is some class of finished case hardened nuts that sell for 50 cents a pound, while the ordinary nut of standard size sells for 2 cents a pound, and yet the duty is the same—1 cent a pound on both classes. In the Canadian tariff they recognize that feature by making on all of these items that I have mentioned a tariff of 75 cents specific and 25 per cent. ad valorem.

Mr. Underwood: Do you suggest that to the committee as an amendment?

Mr. Lord: I would suggest that as a proper method of applying the tariff.

CORRUGATED BOILER FURNACES.

Statement of F. P. Cullen, of the Fitzgibbons Boiler Company, Oswego, N. Y.

Mr. Cullen: I represent boiler manufacturers who are compelled to buy the welded cylindrical furnace. It is an English invention. It is manufactured by a single concern in this country. There are German and Belgian and French types which are satisfactory for the same purposes, and in many instances preferable, which, however, cannot be obtained in this country because of the duty.

There are two patents, one called the Fox and one the Morrison. The present duty on these furnaces is 2½ cents per pound. At that price the importations as compared with the amount used in this country are very inconsiderable, the amount of importation being 7100 lb. last year. There are 250 boiler manufacturers in this country called upon to equip their product with the cylindrical welded furnace, which if they purchase at all they must purchase from the Continental Iron Works of Brooklyn. I am informed that the labor cost in the production of this furnace is about 2½ cents per pound. There is, therefore, a 100 per cent. protection upon the labor cost. It seems to be perfectly evident from the line of discussion here to-day that the steel plate used in the manufacture of this cylindrical furnace can be purchased at least as cheaply in America as in Europe, and that the only question, therefore, as a basis for a duty is the labor. It seems to the several boiler manufacturers whom I represent here that a tariff of about 80 per cent. upon the labor cost of the production would amply protect the American labor, and permit the German and Belgian types of cylindrical furnace to come into America in competition with the single type that is available here to-day, and that absolutely controlled by one concern, and also permit the advantages of this competition to go not only to the manufacturers of boilers, but also to the workmen employed, they employing a very much larger number of workmen than the single plant manufacturing the cylindrical furnace. The information is also given me that the men employed in the Continental Iron Works in the manufacture of cylindrical furnaces are imported labor, skilled labor, brought here from the manufacturing centers of Europe where they learned this work; so that the protection is not only prohibitive, 100 per cent. on the labor cost of the article, but it is also the protection of British-American labor rather than distinctly American labor. The boiler manufacturers believe that this tariff should be either abolished or so reduced as to equal only the difference between the labor cost in Europe and the labor cost in America, and they believe that this duty at its highest figure would be 1 cent per pound.

The Chairman: We will be very much obliged to you for the information showing the difference between the labor cost abroad and here, as far as you can give it, and if you can show the price at which the foreign article is laid down in the report of New York and the price charged for it New York, where you say it is manufactured, or in Brooklyn, for the American trade, we will be glad to have that.

Mr. Cullen: There is so little of it laid down there that its price is going to be very difficult to get.

The Chairman: There is once in a while an importation?

Mr. Cullen: Less than 4 tons were imported last year.

Mr. Dalzell: Can these foreign articles come in without infringing the American patent?

Mr. Cullen: Yes; I think there is no trouble about that. The patents are all right. The German type in particular has been adopted by the United States Government inspectors, and is used in a very large percentage of the ocean steamships.

The Chairman: I understood you to say that you represented some American boiler companies.

Mr. Cullen: All of them.

The Chairman: How are they interested in it?

Mr. Cullen: Because they purchase these cylindrical furnaces to put into their boilers. The cylindrical furnace is simply a tube in which is placed the grate and the firebox. It is an internal furnace as distinct from the external furnace, which is of brick.

The Chairman: The tubes are patented, are they not?

Mr. Cullen: Yes; but there are half a dozen patents.

This tube which is now being manufactured in this country is under an English patent, first patented by one named Fox, and subsequently by one named Morrison. Both of these are English patents. There is a German and a Belgian, and also, I think, a French type, all of which are equally acceptable, and of which, if this duty were not prohibitive, would come into competition with these two English types.

MANGANESE STEEL PRODUCTS.

Statement of George H. Large, of the Taylor Iron & Steel Company, High Bridge, N. J.

George H. Large of the Taylor Iron & Steel Company urged the adoption of a duty that would adequately protect certain products in the manufacture of which considerable quantities of manganese are used. His statement was, in part, as follows:

Mr. Large: I appear before the committee as a practical iron man. This concern, for which I wish to say but a word or two, is an absolutely independent iron manufacturer, located in the village of High Bridge, in Central New Jersey, and it is a concern which for the past 10 or 11 years has been engaged more specifically in the manufacture of new articles in which this element of manganese is the principal factor, creating products which are especially hard, and many of which have been in use but a comparatively few years. They are the wearing parts of all kinds of machines used for crushing and grinding ores, rock, coal, coke, matte, slag, and so forth; screens and grates for sizing such material before and after crushing; sprocket wheels, detachable link belting, and so on; a whole lot of things; for instance, the teeth on a steam shovel bucket, things on which the wear is very great, and which require a very hard substance. Our company thought that in contemplation of this revision of the tariff the language of the act of 1897 was so crude and so imperfect, not meeting the requirements of these new products, that it was incumbent upon it to call the attention of the committee especially to that fact, and ask that in its recommendation to Congress it should give the products which we produce due consideration. There are two or three of these points. In the first place, paragraph 130 reads:

130. Railway bars, made of iron or steel, and railway bars made in part of steel, T-rails and punched iron or steel flat rails, seven-twentieths of 1 cent per pound; railway fish plates or splice bars, made of iron or steel, four-tenths of 1 cent per pound.

Of course that section did not contemplate these manganese steel rails, and therefore we suggest that that section, if that same classification is to be maintained, be amended so as to read as follows:

Railway bars made of iron or steel and railway bars made in part of steel, T-rails, punched iron or steel flat rails, and girder rails, frogs, switches and parts thereof which when completed shall contain at least 7 per cent. of manganese, 30 per cent. ad valorem.

That is what we conceive a fair and equitable duty to be placed upon those manganese steel rails.

In the second place, as to castings, under paragraph 135, we would ask that that section should be amended as to all descriptions and shapes of dry sand, loam, or iron molded steel castings; sheets and plates and steel in all forms and shapes not specially provided for in this act which shall contain at least 7 per cent. of manganese, and that, as I take it, leaves it practically as it is now, because that section says at its close, "valued above 16 cents per pound, 4.7 cents per pound." That would be equivalent—that 4.7 cents would be equivalent—to 30 per cent. ad valorem; so that if that section contains that which I have read, that would be satisfactory to us.

Now, we are in grave doubts as to just where we stand, because of the inadequacy of this act of 1897. We do not know just what duties are to be imposed upon the various products which we have made, none of which were in existence at the time of the passage of that act, and there has not been any experience upon it whereby we may know just where we stand as to the duties.

The Chairman: Are you having any competition from abroad now?

Mr. Large: It has just commenced. It has not developed yet to any serious extent. We do not know whether these articles which we are making come under that article 193, which reads:

193. Articles or wares not specially provided for in this act, composed wholly or in part of iron, steel, lead, copper, nickel, pewter, zinc, gold, silver, platinum, aluminum or other metal, and whether partly or wholly manufactured, 45 per cent. ad valorem.

If that general dragnet clause applies, that makes a greater duty than we think we could stand under. In other words, we would be perfectly content, if these various articles come in under that section 193, when they do come in in any considerable volume, that an ad valorem duty of 30 per cent. instead of 45 per cent. should be imposed, as it is in that section.

WIRE GOODS.

Statement of F. W. Collier of the National Mfg. Company, Worcester, Mass.

Mr. Collier: For 40 years there has existed in New England, particularly, and principally in or near Worcester, Mass., an industry in which are manufactured articles known as wire goods—one of the small New England industries, insignificant in a way, and yet employing from 800 to 1000 hands. I am representing the National Mfg. Company, of which I am president; H. & R. Parker Wire Goods Company, Worcester, and the Woods Strainer Company, Lowell.

The articles manufactured are mostly household utensils. About one-quarter of the product has been of the class of goods known as wire strainers. They are of almost universal use, and still, possibly on account of the small price at which they sell, and possibly on account of lack of alertness on the part of the manufacturers, they have attracted no attention whatever in the previous tariff schedules. They are simply included in that almost infinite classification as goods made of wire, "but not otherwise specified," and as such have taken a duty of 40 per cent. ad valorem, plus 1¼ cents per pound plus 0.2 of 1 cent per pound. We are asking for 60 per cent. ad valorem, plus 20 cents per pound.

Now, while this present duty has proved satisfactory on other lines of our manufacture, on the strainer line it is of no protection whatever, by reason of the low cost to produce abroad, affecting the ad valorem and the light weight of the goods themselves.

They are made of wire cloth of fine mesh and very fine wire, generally No. 30, and bound with a narrow strip of tin plate, so that they weigh, ready for the market, only from 5 to 22 pounds per gross. On most of the other lines of our manufacture the selling price is from 6 to 10 cents per pound, and the specific duty amounts to something, while on the strainers, which are so light, and on which labor is the principal item, the selling price has to be from 40 to 50 cents per pound, and the present specific duty amounts to nothing at all. And, of course, this same lightness in weight, together with the fact that they are shipped nested, operates to keep the freight rate so small that it is not a factor.

Now, until recently, the normal importation has not been harmful to our normal production, because of the former inferiority of the foreign goods. But in the past two years the Germans have acquired the necessary skill and are now sending over goods that are equally as good as ours, and at about one-half of what we must get, and actually less than our stock and labor. Of course, this has increased their business at our expense, and I would like to say right here that it is this encroachment that we are objecting to, rather than to what I would call a normal importation.

The best estimate that I have been able to make is that this normal importation has been about equal to domestic production, confined, however, to a very few houses, as will later appear. And now, lest any one should say that this increased importation has no doubt increased our revenue, I must point out that it has not increased it nearly as much as the higher duty asked for would increase it on a normal importation, for we ourselves would not care to have the duty large enough to prohibit this normal importation, and we do not ask it. By that I mean that the very large buyers, if they could make any saving at all, would continue to import, while the ordinary jobbing trade who find difficulty in ordering in importing quantities would naturally come back to us from convenience even at a little advance over the importation cost. And I would further say that the advanced duty asked for would not be borne by the consuming public, for the goods are sold uniformly at either 5 or 10 cents, mostly 10 cents. Under the normal importation the principal importers are the 5 and 10 cent syndicates, who could not make a different price if they wanted to, but who are the only ones who would care to order in importing quantities, unless there was a very great saving to be effected, as now.

Now, in asking for this increased rate, we have not followed the plan of asking for a good deal more than we expect or need, in the hope that when the "scaling down" comes we will get what we want; but we have figured it out as best we can so that the industry will be put back on the basis it has been on for the past 20 years, and where the normal importation at slightly less costs then would yield us a profit will yield to the Treasury an even greater revenue than now. And we have done this because we believe that "he is thrice armed who hath his quarrel just."

I might also say that in making our prices we try to make them on a basis of 20 per cent. above our total cost. This applies to our entire line, but still we always find at the end of the year that we have made only one-fourth of that percentage on our total sales, from which I believe we are now selling as low as we could possibly sell at a profit.

As to the labor side of the question, I would say that there are probably about 200 hands employed in this branch of the industry, all more or less skilled, and the imminent falling off of the business will work hardship to them. On the other hand, the rate that we propose would keep them employed at fair wages. It would easily increase the rev-

enue, and would be borne entirely by a few large importers, who would still be as well off as they were until very recently.

STEEL FORGINGS AND OTHER STEEL PRODUCTS.

Statement of Thomas Prosser of Thomas Prosser & Son, New York City, Importers.

Thomas Prosser made a number of important recommendations with regard to the reductions in the existing rates of several paragraphs of the metal schedule, as follows:

Steel forgings are now dutiable, under paragraph 127, which reads:

> Forgings of iron or steel, or of combined iron and steel, of whatever shape, or whatever degree or stage of manufacture, not specially provided for in this act, 35 per centum ad valorem.

Under the act of 1864, the duty on this article was 45 per cent. ad valorem. By the act of 1890, paragraph 139, a specific duty of 2 3-10 cents per pound was made, with the proviso "that no forgings of iron or steel, or forgings of iron and steel combined, by whatever process made, shall pay a less rate of duty than 45 per cent. ad valorem." By the act of 1894 the specific duty thereon was reduced to 1½ cents per pound, with like provision that such duty should not be less "than 35 per cent. ad valorem." The act of 1897, paragraph 127, as quoted above, fixes the duty at 35 per cent. ad valorem. We urge a reduction in this duty to 20 per cent. ad valorem.

Steel wire (nickel, alloy) and machinery (grinding and crushing mills) are now dutiable under paragraph 193, of 1897, which reads:

> Articles or wares not specifically provided for in this act, composed wholly or in part of iron, steel, lead, copper, nickel, pewter, zinc, gold, silver, platinum, aluminum or other material, and whether partly or wholly manufactured, 45 per centum ad valorem.

With the exception of the years 1894-1897, under the Wilson act, this rate of 45 per cent. has been in force since 1864. The Wilson act of 1894, paragraph 177, made the duty 35 per cent. ad valorem. We earnestly urge that the duty be reduced to 30 per cent. ad valorem on these articles. No change is asked in the language or wording of the present tariff act, but only in the rate of duty imposed. It is important, in our view, that language which has stood in successive tariff acts, and become the subject of departmental and judicial interpretation and decision, should not be changed. The Government officials and all persons interested have come to understand thoroughly the meaning of such classifications and what they cover, and a mere change in language would be sure to bring confusion and much litigation. The suggestions we submit, upon all the paragraphs on which we desire to be heard, involve only the change of rate, and not change in language for the reasons just stated.

Locomotive and car tires and wheels are dutiable under paragraph 171 of the act of 1877, which provides:

> Wheels for railway purposes, or parts thereof, made of iron or steel, and steel-tired wheels for railway purposes, whether wholly or partly finished, and iron or steel locomotive, car or other railway tires or parts thereof, wholly or partly manufactured, 1½ cents per pound. . . .

By the act of 1870 this duty was made 3 cents per pound; by the act of 1890, paragraph 185, 2½ cents per pound; by the act of 1894, paragraph 156, 1¼ cents per pound. But in 1894 the selling price of tires in this country was 5 cents per pound, and the duty of 1¼ cents was reasonable. Now, the price is 2 cents per pound for tires, and under the new process whereby the entire wheel is made in one piece will approximate 2½ cents per pound. With such large reductions in the value and price of the article, it is manifest a duty of ¾ of a cent per pound is most ample. Indeed, under such circumstances the duty should be put for revenue only.

Boiler and other tubes are dutiable under paragraph 152 of the act of 1897, which reads:

> Lap welded, butt welded, seamed or jointed iron or steel boiler tubes, pipes, flues, or stays, not thinner than No. 16 wire gauge, 2 cents per pound; welded cylindrical furnaces, made from plate metal, 2½ cents per pound; all other iron or steel tubes, finished, not specially provided for in this act, 35 per centum ad valorem.

By the tariff act of 1865 the duty was made 3½ cents per pound; by the act of 1890, paragraph 157, 2½ cents per pound; by the act of 1894, paragraph 130, 25 per cent. ad valorem.

The lap welded process is competitive with the new process of seamless tubes. It would seem that no duty, save wholly for revenue, should be required, inasmuch as the American manufacturers are able to compete with the foreign seamless tubes when sold abroad, and the American article is quoted at lower prices. As an instance, tubes were recently sold in Mexico, of American manufacture, at a price less than could be quoted by the European competitors. It is hence obvious that no duty is required here except for purposes of revenue, and hence it is submitted that a reduction to 20 per cent. from the present rate of 35 per cent. ad valorem is both just and reasonable, for while it could not possibly injure any American manufacturer, it would give opportunity to benefit the public revenue.

The act of 1864 imposes upon bar steel valued from 7 to 11 cents per pound, a duty of 3 cents per pound; and all above 11 cents per pound in value, a duty of 3½ cents per pound and 10 per cent. ad valorem. The act of 1890 made 11 distinct classifications of bar steel on value bases beginning at 1 cent value and less, with a duty of 4-10 per cent., and extending thence through successive increases in value up to 16 cents per pound, with a duty of 7 cents per pound. The act of 1894 maintained the same classifications as to values, but reduced the duty. The act of 1897 maintained the same classifications as to values, but reduced the duty. The act of 1897 maintained the same classifications (paragraph 135), and precisely the same duties imposed thereon by the act of 1894, thus recognizing the propriety of reduction of duties on this article in fair relation to the increase and progress of the manufacture. Upon precisely like reasoning, it is hence now plain that further reductions would be both sound and logical. Thus, in the first three classes a reduction of 1-10 cent per pound; in the next two values of 9-10 cent per pound; in respect of bar steel, valued at 3 to 4 cents per pound, a duty of 6-10 cent per pound: valued at 4 to 7 cents, a duty of 8-10 cent per pound; valued at 7 to 10 cents per pound, a duty of 1 1-10 cents per pound; valued at 10 to 13 cents per pound, a duty of 1 7-10 cents per pound; valued at 13 to 16 cents per pound, a duty of 2 2-10 cents per pound, and valued at 16 cents and above per pound, a duty of 4 cents per pound.

Bar steel, imported as such, is, of course, brought here to be manufactured into useful articles; it is, in a large sense, raw material, and a duty based upon revenue thereon would, in effect, encourage and not retard domestic manufacture here of countless articles wherein bar steel is the basic element. Indeed, in such view, and in aid of American manufacturers, bar steel could well be placed upon the free list.

WIRE AND WIRE ROPE.

Statement of H. J. Bailey, of the Broderick & Bascom Wire Rope Company, St. Louis.

Mr. Bailey: In order to equalize to some extent the vast difference between the duty on raw material (wire) and the duty on wire rope, we respectfully submit that schedule C, paragraph 137, should be amended and revised so as to read as follows:

> 137. Round iron or steel wire, not smaller than No. 13 wire gauge, six-tenths of 1 cent per pound; smaller than No. 13 and not smaller than No. 16 wire gauge, 1 cent per pound; Provided, that all the foregoing valued at more than 6 cents per pound shall pay 30 per cent. ad valorem. Iron or steel or other wire not specially provided for in this act, including such as is commonly known as hat wire, or bonnet wire, crinoline wire, corset wire, needle wire, piano wire, clock wire, and watch wire, whether flat or otherwise, and corset clasps, corset steels and dress steels, and sheet steel in strips, 0.025 in. thick or thinner, any of the foregoing, whether uncovered or covered with cotton, silk, metal or other material, valued at more than 4 cents per pound, 45 per cent. ad valorem; Provided, that articles manufactured from iron, steel or copper wire shall pay the rate of duty imposed upon the wire used in the manufacture of such articles, and in addition thereto 1¼ cents per pound, except that wire rope and wire strand shall pay the maximum rate of duty which would be imposed upon any wire used in the manufacture thereof, and in addition thereto 1 cent per pound; and on iron or steel wire coated with zinc, tin or any other metal no additional duty shall be imposed in addition to the rate imposed on the wire from which it is made.

As reasons for the foregoing changes, we submit the following facts:

Wire is the principal raw material entering into the manufacture of wire rope. We are not manufacturers of wire, but are manufacturers of wire rope, exclusively, which is an independent industry of itself, and approximately 40 per cent. to 50 per cent. of all wire rope made in this country is made by factories that do not manufacture wire. At the present time we import approximately one-third of the total amount of rope wire brought into the United States, as shown by the United States Government statistics. The rope wire required by us for the manufacture of high-grade steel wire ropes is necessarily drawn from rods of Swedish ore stock not produced in the United States, and must, therefore, be imported from abroad.

It is generally admitted that wire can be drawn in this country as cheaply as anywhere. The ordinary grades are not imported into the United States at all, and the higher grades could be successfully drawn here from imported rods of Swedish ore stock; still, as independent wire-rope manufacturers, we ought not to be compelled to buy this high grade wire from American mills, who manufacture wire rope as well as wire, and are, therefore, competitors of ours.

Furthermore, the schedule of prices of various sizes, as published by the American mills, shows no such variance in prices as is shown by the present tariff for various sizes, and the present tariff is, therefore, impliedly, at least, too high to meet any requirements for protection to the wire industry in this country. Furthermore, if any further protection is demanded for wire, we believe that the present duty on wire rods could be eliminated altogether, as it is admitted by most manufacturers of wire that no duty is needed on the rods.

The wire manufacturing industry being among the most

prosperous of any industry in the United States, we are quite sure that 20 to 25 per cent. protective tariff is more than sufficient to meet all justice and fairness.

FERROALLOYS.

Statement of John L. Cox, of the Midvale Steel Company, Philadelphia, Pa.

Mr. Cox: The Midvale Steel Company, which I represent here, is not engaged in the manufacture of what might be called tonnage steel. That is to say, it does not make large quantities of low-priced material. Its output is altogether high-class, and really in the line of specialties. To get the special qualities required in its products, it is necessary that it should use special and elaborate manufacturing methods, and also employ a large number of the ferroalloys, such as ferrochromium, ferrovanadium, and ferrotitanium, as well as the ordinary alloys, such as ferromanganese, spiegeleisen, silico-spiegel, and ferrosilicate. The effect of all these alloys is roughly, in the same direction—to increase the toughness or the hardness, or both, of the steel to which they are added, at either normal temperature or sensibly elevated temperatures. At the present time ferrotungsten, which is the thing of which I wish to speak particularly to-day, is not specifically mentioned on the list. Under a decision by the New York Circuit Court of Appeals, applying to section 7 (the "similitude" section) of the present tariff law, ferrotungsten has been held as dutiable under paragraph 122.

Under the decision of the New York court, the ferrotungsten that we employ was imported at a duty of $4 per ton, being held similar to ferromanganese. On importations which were made for us in 1906 and 1907, the General Board of Appraisers held that ferrotungsten should be taxed under paragraph 183 as "metals unwrought," holding as controlling a decision made by the Philadelphia court in a case which they held to be analogous, though, as a matter of fact, it did not treat of tungsten nor of ferrotungsten, nor of tungsten metal, but of an alloy of iron, tin, and manganese.

My company holds that this addition (which is at present being collected from us under protest) from $4 a ton, the standard rate which it has been for years, to 20 per cent. ad valorem should not be collected. We hold that the material should be specifically mentioned under paragraph 122, or else admitted entirely free of duty. Our reasons are, roughly, as follows:

In the first place, as Mr. Brown explained, the material in every way resembles ferromanganese. It is a pure melting stock. It has no practical application as ferrotungsten, except to steel as a melting stock, and its action on the metal is similar to that of manganese in many respects. Both of them are added to the charge either at the first or in the fluid state. Both of them produce hardness and toughness. Both of them improve the quality.

Second, we believe that it is very inadvisable to tax materials entering into the production of what Mr. Brown very properly termed "high-speed steel," which is simply another name for the more modern varieties of tungsten steel; for by doing so it simply increases their cost to the consumer or limits their use. The advantages which have been gained to the machinists of this country by the introduction of these high-speed steels are very great. They have enabled an enormous increase in the amount of work done by a tool, or a lathe, or a planer; and anything that tends to oblige the machinists to lock up more money in their machine equipment is not to their advantage in any way.

Then we think that there is a great disparity between the industry which is either protected or might be protected by anyhing like the 20 per cent. duty, and the cost to the general public of that duty. The high price of ferrotungsten, which varied from 63½ cents a pound in 1903 for ferrotungsten made in America, to $1 a pound in 1907 for ferrotungsten imported, is not at all due to the cost of manufacture. It is entirely due to the rarity of the ore, and the great and increasing demand for it.

Furthermore, a very large proportion of the tungsten ore at present used is produced in the United States, and an exceedingly small proportion, if any, of the ferrotungsten is made here.

Mr. Clark: Do you want the tariff on this material put down or up?

Mr. Cox: We want it maintained where it has been before this (as we consider) mistaken decision by the Board of Appraisers, which matter is at present under litigation, or else removed entirely.

Mr. Clark: You want it cleared up or removed?

Mr. Cox: Cleared up or removed.

Mr. Clark: Which would you rather have?

Mr. Cox: We would rather have it removed. We would rather have all the tariff removed. We believe that any increase or any tax placed upon ferrotungsten is simply a tax upon the American manufacturer, because it obliges him to pay that much more than is paid by his foreign competitor; and to that extent it is a protection of the foreigner and a disadvantage to the American.

Mr. Clark: Is there any tariff on your finished product?

Mr. Cox: There is.

Mr. Clark: You want to get all of it, then? That is the whole tale, is it not?

Mr. Cox: Not at all; not at all.

Mr. Bonynge: Do you want the tariff reduced on your finished product?

Mr. Cox: We would be very glad to have it done. We are quite willing.

Mr. Clark: On the finished product?

Mr. Cox: We are entirely willing to have it done.

Mr. Clark: As far as I am concerned, you can have it done.

Mr. Cox: If you take the tariff off of our raw material, we shall be most glad to have it taken off the finished product.

HORSE SHOE CALKS.

Statement of Warren R. Chase of the Sterling Mfg. Company, Hartford, Conn.

Warren R. Chase, general manager of the Sterling Mfg. Company, Hartford, Conn., maker of detachable horseshoe calks, made a plea for a specific duty on this product exceeding that now assessed under the basket clause of the metal schedule.

Mr. Chase: I represent the detachable horseshoe calk manufacturers of the country. I have here two boxes—one of the finished product of the factory, and one of the product with the hardened steel core. These calks are a comparatively new product in this country. They are manufactured with a hard center of tool steel and a soft exterior, and are screwed into horseshoes in the winter season. They are used in the snow and ice belt of the United States. The idea is that by having a hard center and a soft exterior they will continually wear sharp wherever they can penetrate the surface upon which the horse's shoes strike. In this connection there are certain points which I wish to outline. In the first place, we are one of these highly specialized Carnegie industries that needs protection, for the very reason that the industry in this country is small, and we are producing not more than 3 per cent. of the total product that can be marketed in the snow belt of the United States. We do not ask for anything additional in the way of a tariff, we might say, nor do we ask for the maintenance of anything in particular at the present time. When the Dingley bill became a law these goods were so little known in this country, there were so few of them manufactured, they were not classified, and until within a year or two there has been no import whatever.

Now, the granting of our request, which is that we have at least $10 a thousand duty, will not in any way affect the price to the consumer. All that we want is to have the present conditions maintained, so that we can maintain our present prices, which are substantially $26 a thousand. These calks are sold to the horse owner in boxes of 50 or in sets of 16. The price usually includes the services performed by the horseshoer at the time they are sold; and the tariff on each calk would be so small that it would not in any way figure in the ultimate price. For instance, these calks that are now being sold at $15 a thousand to the horseshoer are sold to the horse owner at identically the same price as the calks which we put out at $26 a thousand. It is simply a case of life and death between the American manufacturer and the German manufacturer.

FIREARMS.

Statement of Joseph Gales of New York, Importer.

Mr. Gales: If you want a moderate increase of the revenue, we desire to submit the following brief referring to paragraph 158 of the present tariff:

This paragraph presents the principal items of import in firearms at the present time. The items stated in other paragraphs, except those on the free list, are of small importance. We find by inquiry that the total imports at the port of New York have been constantly decreasing, so that in the year ending June 30, 1907, they were less than 30 per cent. of the imports of the year ending June 30, 1900. In the whole United States the total decrease is over 60 per cent. This valuation includes all imports of firearms, including gun barrels and gun stocks, which are on the free list, and make up a large part, perhaps, the larger part of the total, therefore reducing the value of guns imported under this paragraph to even a smaller proportion than the stated figures would indicate. The facts then for your committee to determine are:

1. Does the committee desire to obtain any revenue from the importation of guns?

2. Does your committee feel that the importers of, dealers in, and consumers of imported shotguns are entitled to any consideration under the tariff legislation, or, if the whole matter is to be left in the control of the American manufacturers, to suggest such rates as would make the tariff practically and actually exclusive, and enable them to make combinations and maintain prices at monopolistic figures?

The present import business in breechloading double guns is limited almost entirely to two classes: 1, Of cheaper quality guns than those made by any of the American manufacturers; and, 2, to high priced, exceedingly fine quality guns, which are imported because of their superior workmanship or of the desire which customers have for guns of such style and finish as the American manufacturers are not able to produce.

The cheaper guns are lower than the manufacturers find it worth while to turn out, as they apparently have sufficient demand upon their plants in turning out medium and high-priced guns, for which they find a ready market. On the other hand, the better quality guns are not directly competitive with the American, and pay much less profit to the importer than do the American guns (which sell at 20 to 50 per cent. lower) pay to the manufacturers of same. This statement is based upon the best information that we can get, having been for a great many years extensive dealers in both lines.

Statement of Jesse F. Orton, Secretary Tariff Reform Committee, Reform Club, New York City.

Jesse F. Orton, secretary of the Tariff Reform Committee of the Reform Club, New York City, addressed the committee at great length regarding the desirability of reducing the tariff all along the line and the rates of the metal schedule in particular. Mr. Orton was cross-examined by several members of the committee as to whether any special effort had been made to obtain facts which would be of interest in connection with the pending inquiry, but stated that data in the possession of the Reform Club were only such as was available to the Ways and Means Committee.

TIN PLATE AND THE DRAWBACK.

Statement of William J. Williams, Pittsburgh, Representing the Amalgamated Association of Iron, Steel and Tin Workers.

William J. Williams, on behalf of the Almagamated Association of Iron, Steel and Tin Workers, appeared before the committee to discuss the tin plate paragraph of the metal schedule, and incidentally to protest against the retention in the law of the drawback provision as found in section 30. The result of the drawback provision, he said, was to permit large quantities of tin plate to be imported, used in the manufacture of cans, filled with American products, and exported with benefit of rebate of the duty paid on the plate, thereby preventing the American industry from supplying the plate. The only possible justification for continuing the application of the drawback clause to tin plate, he said, was that the concession enabled American packers and can manufacturers to obtain foreign business which otherwise they would lose. In his opinion, however, the American producers would get the business in any event, and the effect of the drawback clause was simply to increase their profits at the expense of the domestic tin plate producers.

Continuing, Mr. Williams laid before the committee the comparative wage scale in the United States and Wales, and insisted that the tariff should be maintained at a point that would fully offset the differential. It subsequently developed that Mr. Williams' figures regarding wages were compiled in 1892 by an American Consul in Great Britain, a fact that appeared to detract somewhat from their impressiveness in the minds of the committee.

BAR IRON.

Statement of J. H. Nutt, Youngstown, Ohio, Representing the Western Bar Iron Association.

John H. Nutt, on behalf of the Western Bar Iron Association, described that organization which he said had plants in Indiana, Ohio and Illinois, and was organized for the sole purpose of adjusting wage scales for employees through the officers of the Amalgamated Association.

Mr. Nutt: I would respectfully ask that in the adjustment of clause 123 of Schedule C you give due consideration to the difference in wages paid in this country and Europe. Unfortunately, I am only able to obtain the wages paid for similar labor in England, while on the Continent we believe wages to be considerably less. British statistics do not give the price per ton on mill men's wages, but they appear to be based upon the price of puddling, advancing and declining with the same. In the year 1907 the wages paid for puddling in Great Britain was:

	Per ton.
In the Northumberland District	$2.25
In the West of Scotland District	2.43
In the Midlands District	2.31
Average price	$2.33

While during the same year, 1907, the price per ton paid by the members of this association to its employees for the same class of work was from $6.50 to $6.62½ per ton, or, in other words, the English puddler received from 35 to 40 per cent. of what was paid to the puddlers in the mills of your petitioners; and it is fair to assume that there is substantially the same proportion of difference in all other classes of labor.

Our agreement with the Amalgamated Association provides that whenever the selling price of bar iron advances $1 per ton above the base rate, the labor shall advance from 1 to 2½ per cent., according to the scale of each particular department. That at the present time is 6 per cent. above base rates. So that if by any undue reduction in the tariff rates you should bring about lower prices for bar iron, the labor employed in its manufacture must suffer its proportion of the lower prices.

The mills making iron bars are in no way interested in the manufacture of steel, but as steel bars can in a large number of places be used to take the place of iron bars the price of steel largely influences the selling price of iron bars. The manufacture of steel bars being largely a mechanical proposition, while the manufacture of iron bars must necessarily remain one of skilled manual labor, the cost of producing the latter is considerably higher, and at the present time at least $3.50 per ton above the cost of steel bars. Therefore, we ask that the same differential be maintained as in the present tariff bill.

The mills making iron bars are scattered all over this country, from Maine to California, and are, for the most part, what are considered small mills, whose tonnage is not large, but who supply a certain locality with its merchant bars largely made from the scrap made in its own market, which is considered greatly to the advantage of those producing scrap in those sections, and should be considered in making up this schedule. For the above reasons we ask that in fixing the tariff on iron bars you give due consideration:

First. To the difference in wages paid to the labor in this country, and that paid in other countries engaged in manufacturing the same product.

Second. That on account of the largely increased cost of producing iron bars over steel, whatever may be the rate agreed upon, you will maintain a corresponding differential between steel and iron bars as in the present tariff measure.

Third. That on account of the mills making iron bars being scattered through so many localities the people in so many States of this Union are interested in the preservation of this industry.

Statement of John W. Walton of Cleveland, Ohio, Dealer in Wire Rope.

John W. Walton, a wire rope dealer of Cleveland, Ohio, urged the committee to reduce the tariff somewhat on wire rope in the interest of the consumer, and he also suggested that the compound duties be simplified so that importers could calculate in advance the tax they would be obliged to pay upon the foreign product.

Statement of Nelson Lyon of the Holt-Lyon Company, Tarrytown, N. Y.

Nelson Lyon, secretary and treasurer of the Holt-Lyon Company, Tarrytown, N. Y., told the committee that while the tariff had certainly built up the iron industry and cheapened production, its present schedules were not in the interest of small manufacturers or consumers. The concern he represented manufactures large quantities of wire goods, making specialties of carpet beaters, egg beaters, &c., and has been called upon to pay constantly increasing prices for wire, especially since the organization of the American Steel & Wire Company. He thought a reasonable reduction in the present tariff would be to the advantage of the consumer without injuring the producers.

RAZORS.

Statement of Hon. E. B. Vreeland, Representative from New York.

Representative Edward B. Vreeland of Salamanca, N. Y., addressed the committee in the interest of Geo. W. Korn, a manufacturer of razors in his Congressional District.

Mr. Vreeland: I assume that it is the purpose of this committee in revising the tariff not only to provide adequate protection, but to maintain the existence of industries which we now have, and if there is opportunity it will put on duties sufficient to create new industries in this country, as the tin plate industry was created by the last tariff. I want to say that in this country when the Dingley bill was adopted there was practically no manufacturing of razors in this country. There was only one man trying to make razors. He was making a specialty and selling it not generally on the market. So no one appeared before the committee asking for protective duties or furnishing information upon which proper schedules could be made up. Therefore, this is really creating an industry, the industry of making razors, which I suppose would employ something like 1000 or 1200 skilled workmen if they had the right to fill the American market. Under the existing tariff 10 factories in this country, many of which made cutlery, have endeavored to make razors. Five of them have made a failure of it, and discontinued entirely. There are only at present two firms making razors exclusively in the United States. One is the factory which I represent, and the other is located in Geneva, N. Y.

Last year the total amount of value, in dollars, of razors made in the United States was very close to $176,000. The

value of imported razors was $830,566. That is, we are importing now more than five times the amount in value of razors which we produce in this country. Two hundred and fifty-five thousand dozen were imported from abroad during the past year. Therefore I say that I am asking the committee to put on a tariff duty which will in effect create a new industry which will give employment to a large number of men, and which I do not think will increase the price to the consumer—I mean the actual consumer, the man who buys the razor for his own use.

BALL AND ROLLER BEARINGS.

Statement of Samuel S. Eveland, Philadelphia, Pa.

Samuel S. Eveland, Philadelphia, said that he was a manufacturer of steel balls, ball bearings, roller bearings, &c., and used a large amount of raw steel. He appeared for the purpose of stating that, although he was a large consumer of steel, he thought the tariff ought to remain on for the general prosperity of the country.

Mr. Eveland: I think that any benefit that the manufacturer or the consumer of steel would receive by reason of a reduction would be more than offset by the injury to the business as a whole. In my case I use about $500,000 worth of steel and about $100,000 worth of pig iron a year, and I do not believe that any material benefit would result from the reduction of the duties whatever. It would not be a benefit, and would possibly be an injury to the country as a whole. I am aware of the fact—at least, I infer it from what I have heard from steel men—that they are in favor of a reduction, or at least would be willing to have a reduction made.

Mr. Clark: If you simply buy the steel and work it up, what is the reason you do not want to get the steel as cheaply as you can get it?

Mr. Eveland: In my case I do not think there would be any benefit in it.

Mr. Clark: If it was cheaper it would be a benefit to you?

Mr. Eveland: Yes; it would reduce the first cost of the steel to me, but I think the country as a whole would suffer to such an extent that the consumption of my product as well as the product in many other lines would be reduced. I do not think you can possibly reduce the cost of steel to the consumer here without reducing the wages of the workingman. I base that upon investigations that I made about six months ago in Europe.

POCKET CUTLERY.

Statement of Dwight Divine, Ellenville, N. Y., Representing American Pocket Cutlery Manufacturers.

Mr. Divine: In protesting against any changes in the schedules relating to penknives or pocketknives or parts thereof, or erasers or parts thereof, the undersigned committee, representing practically 100 per cent. of the manufacturers of American pocket cutlery, respectfully submit the following facts for your consideration:

That the pocket-cutlery industry in the United States is controlled by no trust, combination, or agreement.

That there are in existence and in operation at the present time about 35 factories (located in New York, Connecticut, Massachusetts, New Jersey, Pennsylvania, and Ohio) engaged in the manufacture of pocket cutlery, each absolutely distinct from all others as to ownership, interest, or control, and in active competition with each other.

That the average proportion of labor to cost of all merchandise imported is about 30 per cent. The actual proportion of labor to cost of American pocket cutlery is 80 per cent.

That it has been proved that cutlery operatives' wages are three times greater in this country than in Germany, and more than double those paid in England.

That the American manufacturers were rapidly losing their business from 1894 until 1897, under the Wilson act. The shrinkage of sales for the fiscal year ending June 30, 1896, alone figured 25 per cent. as compared with the sales of the previous year.

That since the operation of the present schedules the total amount of pocket cutlery produced in the United States has increased from approximately $1,000,000 to $3,000,000; in dozens produced, from 325,000 to approximately 1 000,000.

That more than 4000 operatives are now employed in the manufacture of pocket cutlery in this country, at wages ranging from $3 to $4.50 per day for skilled workmen.

That despite the advanced rates of duty under the Dingley act and the increased American production, the importation of foreign pocket cutlery has steadily increased, both in quantity and value, with a corresponding increase in revenue to the Government, while at the same time affording that protection that insures to the American workman a just return for his labor and to the manufacturer a fair margin of profit.

CHAIN.

Statement of H. F. Mattern of the Lebanon Chain Works, Lebanon, Pa.

H. F. Mattern, vice-president of the Lebanon Chain Works, Lebanon, Pa., urged a revision of the chain schedule by increasing certain rates and reducing others.

Mr. Mattern: The chain manufacturers desire to ask the committee to make a revision of the chain schedule by subdividing the schedule into a greater number of classes than at present. The tariff on large sizes of chains we would have reduced, and on the small sizes we ask for an advance, so as to equalize and give us an opportunity to compete with foreign manufacturers of chains. The principal thing we want to ask is an opportunity to compete. We do not ask for a prohibitive tariff, but a competing tariff. On small sizes of chains like ¼-in. and 5-16 in., there is a great deal more imported than is manufactured in this country, for the reason we are not able to compete with foreign manufacturers under the present duty.

We would propose that on sizes 2 in. and larger, which are principally anchor chains, the tariff shall be reduced. I cannot make any proposition or suggestion as to what it should be reduced to, because I have been unable to obtain the prices at which that class of chains is sold in foreign markets. I might make an effort to get that information, and I hope to have it inside of a week, and we will then be able to make a few suggestions along the lines of those sizes.

Thomas T. Woodhouse of the Woodhouse Chain Works, Trenton, N. J., made a statement along the same lines as that of Mr. Mattern, emphasizing the necessity for the protection of the domestic industry against the competition of German producers on certain sizes.

AUTOMOBILES.

Statement of Charles H. Sherrill, Attorney for Automobile Importers.

Charles H. Sherrill, counsel for a number of importers of automobiles, urged a reduction in the duty thereon, basing his argument chiefly upon the fact that foreign cars are brought into the United States in an unfinished condition and require the expenditure of a large amount of domestic labor before they can be placed on the market.

Mr. Sherrill: This association is not an association formed for the purpose of maintaining prices. It is an association consisting of about a dozen of the leading importers of foreign-made automobiles. In almost every instance when foreign-made articles (whether furniture, woolen goods, &c.) are imported into this country this act of protection is fully justified, because directly after the arrival here of the imported article and the payment of its customs duty it is at once offered for sale without adding in any way to the wealth of our people by any payments to American manufacturers or workmen. It immediately enters into competition with the American-made article, which looks to the tariff to prevent being undersold by the foreign article. The case of an imported automobile is an entirely different one, for it not only contributes largely to the American manufacturer and workman after its arrival in this country, and before its sale, but even during the period of its manufacture in the foreign country the large proportion of American-made machinery used in its manufacture contributes handsomely to the foreign sales of American-made machinery and tools.

An extremely small percentage of foreign made automobiles arrives in this country in a finished condition, considerably over 90 per cent. being landed here either in an unfinished condition which necessitates for their completion the addition of machinery parts made in America, or else they arrive here as naked chassis; that is to say, nothing but the wheels with the mechanical running gear, and without the body built upon them. Therefore not only does the foreign automobile contribute to the United States by paying the tariff duties, but immediately upon its arrival here it begins to contribute to the wealth of our nation by purchasing American machinery, employing American labor, and generally contributing to a wide range of our business interests by paying insurance, rent, &c. Of how great an advantage this is to the manufacturer and the workmen of the United States can be seen from the fact that the importers composing the importers' automobile salon have paid American carriage builders over $1,000,000, and also an equal sum to American manufacturers for mechanical parts, tires, &c. Before leaving this point it should be remarked that as the average American made automobile has its carriage body built in its own shops, it is to the foreign made automobile that the carriage builders of this country owe the fact that they have not been severely embarrassed financially by the fact that carriages are being rapidly driven out of the field by automobiles. The carriage building industry in New York City owes a great debt in this regard to the enormous orders it has secured from the importers of foreign made automobile chassis. How beneficial this trade is to the American carriage builder may be judged from the fact that foreign made chassis during the four years ending June 30, 1908, are reported by the New York Custom House to have

aggregated in value $16,896,983.71, and for over 90 per cent. of these chassis carriage bodies were built by American carriage builders.

Another service rendered to American manufacturers by foreign automobile factories is the splendid manner in which they have assisted to introduce the use abroad of American machinery. In many foreign countries it has proved difficult to persuade them to accept our machines, and therefore it has proved most beneficial to our manufacturers that foreign automobile makers have taken the lead in purchasing American machinery. The valuable reports compiled for our Department of Commerce and Labor by Capt. Godfrey L. Garden, after his examination of foreign automobile factories, are most instructive in showing what a large outlet they provide for American machinery. The plant of the Fiat Company contains $200,000 worth of American machinery, that of the Hotchkiss Company $175,000, &c.

We have shown how valuable to the American manufacturer is the foreign-made automobile, not only after its arrival here, but in the purchase for its manufacture abroad of American machinery, and, further, how great are the sums that it pays to various branches of American business in this country before it is sold. Now, let us consider the infant industry, for which strenuous efforts are now being made to maintain the tariff at its present rate or to raise it. Instead of an infant industry which is seeking protection at the hands of your committee, it could more properly be called a trust. The American manufacturers of automobiles are divided into two large groups, one the Association of Licensed Automobile Manufacturers, which is organized about the so-called "Selden patents," and the other the American Motor Car Manufacturers' Association, which does not own allegiance to the Selden patents. The Selden patent is an ingenious device to maintain a high price for automobiles among the manufacturers using the patent. Up till now all attempts to break this trust have failed, because its foundation is a United States patent, which is a monopoly granted by the Government.

We believe that a reduction in the tariff on automobiles would result in a corresponding reduction in the selling price of all automobiles, whether of home or foreign manufacture; that a reduction in the selling price would mean an increase of cars sold, whether home-made or foreign; that an increase in the number of automobiles sold would mean an increase in the number of men employed in manufacturing, manipulating, finishing, and driving, which would result in a marked increase of prosperity to the manufacturers and the laboring classes.

ALUMINUM.

Statement of Arthur B. Davis, Representing the Aluminum Company of America, Pittsburgh.

Mr. Davis: I appear before you to ask for a retention of the duty and to explain the fact that the competition which we are now meeting from foreign producers is of a different character from that which we have met before, and is not of a temporary nature due to the depression which exists at the present time. During the last four or five years the producing capacity of aluminum abroad was confined to five companies, and these companies were hardly able to supply the Continental demand and the demand in South America, the demand, in fact, outside of the United States; but in the fall of 1907 and in the spring of this year, 1908, seven more companies started almost simultaneously, and at the same time the five old companies finished large additions to their plants. The consumption of aluminum abroad in 1907 was about 7000 tons. I do not know what it is this year, but naturally substantially less on account of the depression.

The manufacturing capacity by means of these additions and these new plans is about six times the normal consumption of the Continent, and these foreign manufacturing companies are looking to this market in order to get rid of their surplus product, and so far as we can see there will be no let up to their invasion of this market, and every sale that we make, every quotation that we make, is now made in direct competition with the foreign producers.

LEAD.

A large delegation appeared before the committee to advocate the retention of the duties on lead both in the ore, pig and finished product. Among those members of the delegation who addressed the committee were C. E. Allen, representing the Commercial Club of Salt Lake City, Utah, and Edward A. Rozier of Farmington, Mo., who described the condition of the industry as so precarious that the Dingley duties were necessary to its continuance.

Milton L. Lissberger of Marks, Lissberger & Son, Long Island City, N. Y., also appeared as the representative of 51 manufacturers of lead goods of various kinds, and urged the repeal of the existing duties on the ground that they are solely in the interest of certain large smelting combinations, and that they place a high tax on many important lines of manufacture, notably plumbing, which, because of the necessity for good sanitation, should be encouraged in every reasonable manner.

The American Institute of Chemical Engineers.

A meeting of the American Institute of Chemical Engineers is to be held in Pittsburgh, December 28 and 29, in the buildings of the Carnegie Technical Schools. Papers of general chemical engineering interest are to be presented. Notably among these will be the first technical statement by the inventor, James Gayley, regarding the process for dehydrating air, to be used in blast furnaces, and other metallurgical apparatus. Other papers on the use of fuels and power production are to be presented. The measurement of high temperatures and dryer calculations and dryer design are the subjects of two other important papers.

One interesting feature of the Pittsburgh meeting will be the exhibition by manufacturers of novel plants and machinery, partly by drawing and partly by the actual installation for tests in the presence of the Institute. These exhibitions and tests are in no way official in that the Institute does not undertake to pass official judgment upon any of the exhibits, and are no more sanctioned or indorsed by the Institute than technical papers presented to it would be, but are offered by the manufacturers as a method of acquainting those in charge of manufacturing operations with the latest and best machinery in the various lines. Such an exhibit, however, should be an increasing source of breadth and education to the members, and the tests and discussions which will inevitably result from the special installation of machinery for this purpose, should do much to unify the judgment of chemical engineers on the question of certain classes of apparatus which have hitherto been largely matters of individual opinions.

This meeting will be the first annual meeting of the American Institute of Chemical Engineers, organized last spring in Philadelphia for the purpose of bringing together all those who are particularly interested in the combined application of chemistry and engineering to technical problems. The organizers of the Institute, after considerable investigation as to the need of such a society, have made the qualifications for active membership extremely rigid, believing that a very important object of an organization of chemists and engineers (besides meeting for purely social purposes) should be the raising of professional standards among its members. To this end a careful and serious effort is being made to so limit membership that admission to the Institute will be in itself an evidence of the standing and reliability (both business and professional) of its members.

That there was need for some such movement is sufficiently evident by the extent to which fake processes have at times been offered in this particular field. Hitherto chemistry has, by the very nature of the phenomena studied, the transformation of matter, presented that element of the mysterious which seems to be important to the successful exploitation of fraud. Numerous patents, which never worked and never could work, have been taken out and sold or made the basis of wildcat companies. Numerous manufacturers have been victimized, and it is hoped that in time the Institute of Chemical Engineers may be able to do for the chemical engineering profession what the Society of Civil Engineers has so ably accomplished in its field.

All communications from those desiring to attend the Pittsburgh meeting, or from manufacturers who desire to exhibit, should be addressed to the secretary, Dr. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y.

Electric Smelting.

TORONTO, November 28, 1908.—Dr. Eugene Haanel, Director of the Mines Branch of the Mines Department at Ottawa, has left for Sweden to be present at the opening of a furnace for the electric smelting of iron at Domnarfvet. This furnace is the outcome of experiments that have been in progress in Sweden since the completion of the experiments at Sault Ste. Marie. The Swedish investigations were carried on by three commissioners appointed not by the government but by a firm of ironmasters, who appropriated for the work a sum equal

to about $56,000 in our currency. The commissioners in question were an electrical expert, a metallurgical expert and a mechanical expert. In the two years of their labors they operated with various furnaces that they had constructed in the course of the work, and finally evolved that at Domnarfvet. Dr. Haanel has been invited to observe its working and report thereon. He is advised that this furnace marks a great advance on former successes in the same line. It will use 800 hp. instead of the 250 hp. of the Sault experimental plant. A furnace of 3000 hp. could be constructed on the same plan and would have a capacity of 10,000 tons of pig iron a year. In Sweden the cost will be $12.03 per ton. C. A. C. J.

The Red Iron Ores of Alabama.

Probably the most complete and satisfactory discussion of the occurrence, character, extent and origin of the Clinton iron ore deposits in Alabama is contained in a paper presented at the Chattanooga meeting of the American Institute of Mining Engineers by Ernest F. Burchard of the United States Geological Survey, Washington, D. C. It covers 59 pages in the November *Bulletin* of the Institute and accompanying it is the statement that a detailed report on the Birmingham District, with maps, will be published as a bulletin of the Survey this year. The title will be "The Iron Ores, Fuels and Fluxes of the Birmingham District, Alabama," and the authors are Edwin C. Eckel, E. F. Burchard and Charles Butts.

Mr. Burchard's paper is a thoroughgoing presentation of the methods employed in making estimates of the ore reserves of northern Alabama. These represent a most painstaking study of the structure and composition of the various seams and of their continuities as well as irregularities. We have room for two quotations from the paper, one referring to actual mining development on Red Mountain in the Birmingham District, and the other summarizing the results of the computation of red ore reserves.

Mining Operations on Red Mountain.

There have been three stages in the development of the mines in the Birmingham District. The first stage consists of trenching the ore beds along the outcrop on the crest or on the northwest slope of Red Mountain and of mining the ore from open cuts on the southeast slope. The ore obtained in this way is mostly soft. This method of mining has been possible only where the overlying beds are not too thick to be stripped profitably. Most of the mines have passed beyond this stage, but at the Helen-Bess and the Green Spring workings this very profitable type of mining may still be seen.

The second stage of development combines the open cut and incline with underground work. A very fortunate relation between the structure of the "Big" and "Ironside" seams and the topography of Red Mountain exists in many places, particularly in the northern half of the district, wherever the dip of the Clinton strata is approximately the same as the southeast face of the mountain. This face is cut by narrow V-shaped ravines at intervals of 0.5 to 0.75 mile, and on both sides of many of these hollows the two seams are exposed from the crest to the foot of the ridge. Inclined tramways are built on the flanks of the ravine, and when the outcropping ore has been surface worked entries are driven in on the strike of the ore beds from each side of the ravine and the ore is mined from the upper side of the entries. A cable tramway may be operated by gravity or by power, depending on the side of the mountain on which the ore is to be delivered. At the Sloss-Sheffield Ruffner mine No. 1 the tracks of the railroad which transports the ore to the furnaces are on the southeast side of the mountain, making it possible for cars loaded with ore going down the mountain to pull up the empties, but at the Valley View mine of the Birmingham Ore & Mining Company the ore is hauled up over the mountain and loaded into railroad cars on the opposite side. At mines of this type soft, semihard and hard ores are obtained, depending on the thickness and character of the cover overlying the ore bed.

The third stage of mining, the one to which the majority of the workings in the Birmingham District have now attained, involves systematic underground work entirely. The general plan is very simple, comprising a main or central slope, driven on the dip, from which right and left headings are turned off at regular intervals of from 60 to 70 ft. The ore, which is mainly hard, is mined from the upper side of the entry, about 30 ft. being left between the entries until robbing is begun. Mules haul the trams to the mouths of the entries, whence the ore is moved up the slope by cable to a tipple, below which it is crushed and loaded directly into cars bound for the furnace. A manway is usually provided at one side of the slope for safety. Comparatively little water is encountered even in the deepest workings of this type, so that a 3 to 4 in. pump usually suffices to drain the mine.

A fourth stage, which some of the workings may reach in the near future, will likely be shaft mining in the basin east of Red Mountain. The working face of the ore bed can be reached more directly by a vertical shaft from 300 to 500 ft. in depth than by a slope five to six times that length.

In the summer of 1906 there were 33 mines actively producing red ore in the district, besides seven or eight workings which have been inactive since the soft ore was exhausted from them. Of the 33 mines in operation 30 are on Red Mountain, within a distance of about 25 miles between Pilot Knob on the northeast and Sparks Gap on the southwest. In places in the middle of the district the underground workings are practically continuous for 3 or 4 miles, and the old surface workings on the outcrop of the ore may be traced without break for 15 miles or more.

The Amount of Red Ore Reserves.

Summarizing the results of the computation there are estimated red ore reserves:

	Gross tons.
For main portion of Birmingham District	351,149,500
For district south of Dudley	6,929,600
For Lookout Mountain District	125,651,100
Total	483,730,200

This brings the total fairly well toward 500,000,000 gross tons of ore, and it is probable that that amount would be exceeded by any estimate that considered carefully the portions of the field not included within the present estimate. The preliminary estimate made by Mr. Eckel of 1,000,000,000 gross tons of red ore in Alabama, including as it did much ore probably carrying 25 to 30 per cent. of metallic iron, and occurring in beds at present regarded as too thin to be profitably worked, but of possible future value, appears to be consistently supported by the present estimate of ore reserves probably workable under present conditions.

It should be repeated that the present estimate is based on the belief that the hard ore beds are the result of a single concentration of iron oxide sediments that took place when the beds were deposited; that they occur as fragments of what were originally rather uniform lens-shaped bodies; that, as a consequence of their supposed method of origin, the content of metallic iron does not greatly diminish from the point where the hard ore is first encountered in the mine slopes to the point where the bed has thinned to a minimum workable thickness, and, finally, that the structure remains fairly constant, as indicated in the foregoing discussions. This last element, it should be remembered, is one of the most uncertain with which the miner has to deal and can be rendered more certain only by thorough and systematic prospecting with the core drill in places where there are no definite mine data or reliable geologic indications available. Unexpected structural complications and "horses" of barren rock may, of course, greatly reduce the quantity of recoverable ore counted on in this estimate.

The production of pig iron in Germany in September was 928,729 metric tons, as compared with 1,091,020 tons in September, 1907. The total production of pig iron in the first nine months of the year was 8,924,665 tons, against 9,688,484 tons in the first nine months of 1907, a falling off of 763,819 tons.

The Present Status of Military Aëronautics.—I*

BY MAJOR GEORGE O. SQUIER, U. S. A.

On December 23, 1907, the Signal Corps of the Army issued a public advertisement and specification calling for bids for furnishing the Government with a heavier than air flying machine capable of carrying one passenger besides the aviator, and remain in the air on an endurance test for 1 hr. without landing, and over a measured course of more than 5 miles, against and with the wind, attain a minimum speed of 36 miles per hour. The machine must, in addition, carry fuel for a continuous flight of not less than 125 miles. Contracts were awarded to the Wright brothers of Dayton, Ohio, for the sum of $25,000 for a 40-mile speed, and also to A. M. Herring of New York for the sum of $20,000. The result of issuing this specification, as well as a similar one for supplying a small dirigible balloon for the preliminary training of the men of the Signal Corps, was an awakening of interest in this subject throughout the country to such an extent that the Signal Office continues to receive daily a large number of letters, plans, and models proposing manifold schemes for navigating the air. The Aëronautical Division of the Office of the Chief Signal Officer of the Army was organized on July 1, 1907, and the Aëronautical Board of the Signal Corps was appointed in July of the current year for conducting tests of dirigible balloons and aëroplanes under existing contracts.

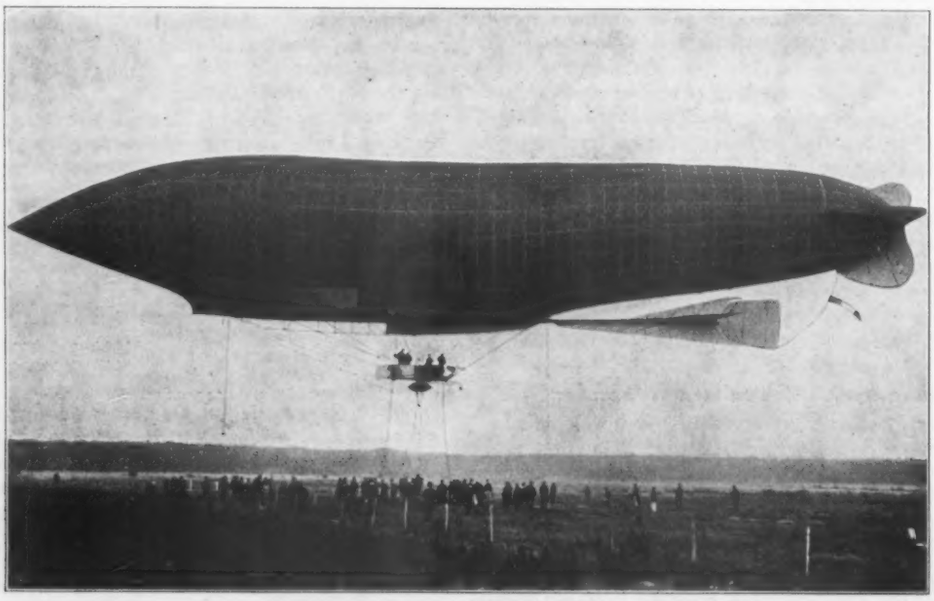


Fig. 1.—The French Dirigible Balloon Patrie.

There are two general classes of vehicles of the air, those which depend for their support upon the buoyancy of some gas lighter than air, and those which depend for such support upon the dynamic reaction of the air itself. These classes are designated lighter than air types: free balloons, dirigible balloons or airships; heavier than air types: aëroplanes, orthopters, helicopters, &c. These two general classes exhibit a growing tendency to overlap each other; the latest dirigible balloons are partly operated by aëroplane surfaces, and are also often balanced so as to be slightly heavier than the air in which they move, employing the propeller thrust and rudder surfaces to control the altitude.

AËROSTATION.

Successful Military Dirigible Balloons.

Two types of dirigible balloons have been used in the French army: the Patrie and the Ville de Paris.

The Patrie,

the third of its type, was developed by Julliot and was first operated in 1906. The gas bag of the Patrie was 197 ft. long with a maximum diameter of 33 ft. 9 in., about two-fifths of the length from the front; volume 111,250 cu. ft.; length approximately six diameters. Pointed at the rear is generally admitted to be the proper shape for least resistance, but to maintain stability it was necessary to put a horizontal and vertical plane there, so that it had to be made an ellipsoid of revolution to give attachment for these planes. The ballonet for air had a capacity of 22,958 cu. ft. or about one-fifth of the total volume. This is calculated to permit reaching a hight of about 1 mile and to be able to return to the earth, keeping the gas bag always rigid. To descend from a hight of 1 mile, gas would be released by the valve, then air pumped into the ballonet to keep the gas bag rigid, these two operations being carried on alternately. On reaching the ground from the hight of 1 mile the air would be at the middle of the lower part of the gas bag and would not entirely fill the ballonet. To prevent the air from rolling from one end to the other when the airship pitches, thus producing instability, the ballonet was divided into three compartments by impermeable cloth partitions. Numerous small holes were pierced in these partitions through which the air finally reached the two end compartments.

In September, 1907, the Patrie was enlarged by 17,660 cu. ft. by adding a cylindrical section at the maximum diameter, increasing the length but not the maximum diameter.

The gas bag is cut in panels; the material is a rubber cloth consisting of four layers: An outer layer of cotton cloth covered with lead chromate; layer of vulcanized rubber; layer of cotton cloth, and an inner layer of vulcanized rubber. Its total weight is 9.71 oz. per square yard. A strip of this cloth 1 ft. wide tears at a tension of about 934 lb. A pressure of about 1 in. of water can be maintained in the gas bag without danger. The lead chromate on the outside is to prevent the entrance of the actinic rays of the sun which would cause the rubber to deteriorate. The heavy layer of rubber is to prevent the leaking of the gas. The inner layer of rubber is merely to prevent deterioration of the cloth by impurities in the gas. This material has the warp of the two layers of cotton cloth running in the same direction and is called straight thread. The material in the ballonet weighs only about 7¾ oz. per square yard and has a strength of about 336 lb. per running foot. When the Patrie was enlarged the specifications for the material allowed a maximum weight of 10 oz. per square yard, a minimum

* From a paper presented December 2, 1908, at the New York meeting of the American Society of Mechanical Engineers.

strength of 907 lb. per running foot, and a loss of 5.1 cu. in. of hydrogen per square yard in 24 hr. at a pressure of 1.18 in. of water. Bands of cloth are pasted over the seams inside and out with a solution of rubber to prevent leaking through the stitches.

One of the characteristics of the Patrie is the short suspension. The weight of the car is distributed over only about 70 ft. of the length of the gas bag. To do this, an elliptical shaped frame of nickel steel tubes is attached to the bottom of the gas bag; steel cables run from this down to the car. A small hemp net is attached to the gas bag by short wooden cross pieces or toggles which are let into holes in a strong canvas band which is sewed directly on the gas bag. The metal frame, or platform, is attached to this net by toggles, so that it can be quickly removed in dismounting the airship for transportation. The frame can also be taken apart. Twenty-eight steel cables about 0.2 in. in diameter run from the frame down to the car, and are arranged in triangles. Due to the impossibility of deforming a triangle, rigidity is maintained between the car and gas bag. The objection to the short suspension of the Patrie is the deformation of the gas bag. A distinct curve can be seen in the middle.

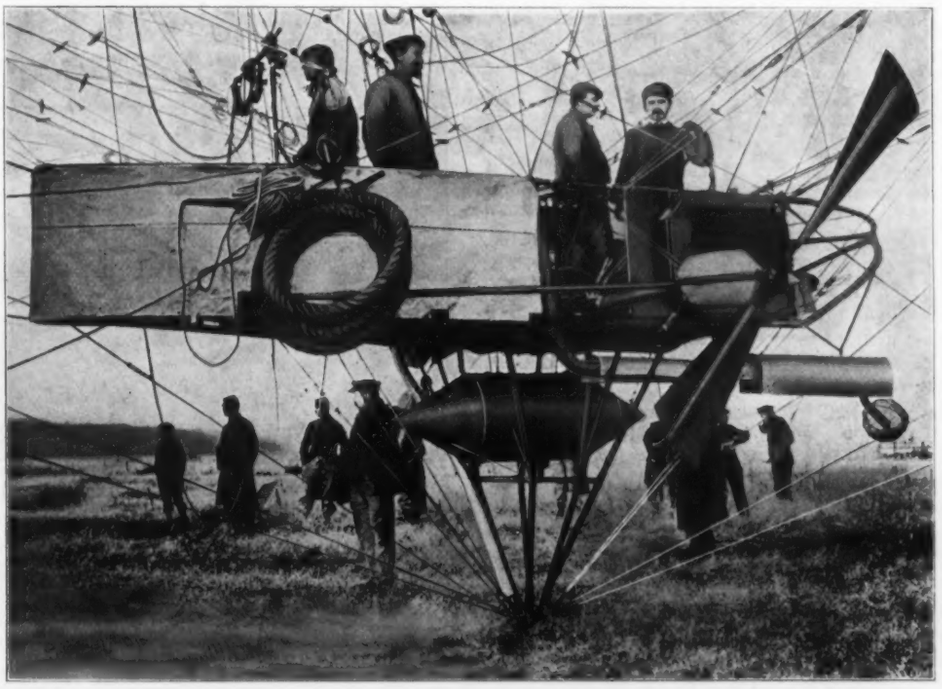


Fig. 2.—A Nearer View of the Car of the Patrie.

The car is made of nickel steel tubes (12 per cent. nickel). This metal gives the greatest strength for minimum weight. The car is boat shaped, about 16 ft. long, about 5 ft. wide, and 2½ ft. high. About 11 ft. separate the car from the gas bag. To prevent any chance of fire from the engine communicating with the hydrogen, the steel framework under the gas bag is covered with a noncombustible material. The pilot stands at the front of the car, the engine is in the middle, the engineer at the rear. Provision is made for mounting a telephotographic apparatus, and for a 100-cp. acetylene searchlight. A strong pyramidal structure of steel is built under the car, pointing downward. In landing the point comes to the ground first, and this protects the car, and especially the propellers, from being damaged. The car is covered to reduce air resistance. It is so low, however, that part of the equipment and most of the bodies of those inside are exposed, so that the total resistance of the car is large.

The Patrie was driven by a 60 to 70 hp., four-cylinder Panhard & Levassor benzine motor, making 1000 rev. per min. There are two steel propellers, 8½ ft. in diameter (two blades each), placed at each side of the engine, thus giving the shortest and most economical transmission. To avoid any tendency to twist the car the propellers turn in opposite directions. They are high speed, making 1000 to 1200 rev. per min. The gasoline tank is placed under the car inside the pyramidal frame. The gasoline is forced up to the motor by air compression. The exhaust is under the rear of the car pointing down and is covered with a metal gauze to prevent flames coming out. The fan which drives the air into the ballonet is run by the motor, but a dynamo is also provided so that the fan can always be kept running even if the motor stops. This is very essential, as the pressure must be maintained inside the gas bag so that the latter will remain rigid and keep its form. There are five valves in all, part automatic and part both automatic and also controlled from the car with cords. The valves in the ballonet open automatically at less pressure than the gas valves, so that when the gas expands all the air is driven out of the ballonet before there is any loss of gas. The ballonet valves open at a pressure of about 0.78 in. of water; the gas valves at about 2 in.

Vertical stability is maintained by fixed horizontal planes. One having a surface of 150 sq. ft. is attached at the rear of the gas bag, and due to its distance from the center of gravity is very efficient. The elliptical frame attached under the gas bag has an area of 1055 sq. ft., but due to its proximity to the center of gravity has little effect on the stability. Just behind the elliptical frame is a horizontal plane of 150 sq. ft., and a vertical plane of 113 sq. ft. To maintain horizontal stability—that is, to enable the airship to move forward in a straight line without veering to the sides—fixed vertical planes are used. One runs from the center to the rear of the elliptical frame and has an area of 108 sq. ft. In addition to the vertical surface of 113 sq. ft. at the rear of the elliptical frame, there is a fixed plane of 150 sq. ft. at the rear of the gas bag. To fasten the two perpendicular planes at the rear of the gas bag cloth flaps are sewed directly on the gas bag. Nickel steel tubes are placed in the flaps, which are then laced over the tubes. With these tubes as a base, a light tube and wire framework is attached and waterproof cloth laced on this framework. Additional braces run from one surface to the other and from each surface to the gas bag. The rudder is at the rear under the gas bag, has about 150 sq. ft., and is balanced. A movable horizontal plane near the center of gravity, above the car, is used to produce rising or descending motion, or to prevent an involuntary rising or falling of the airship, due to expansion or contraction of the gas or to other causes. After adopting this movable horizontal plane the loss of gas and ballast was reduced to a minimum. Ballast is carried in 10 and 20 lb. sand bags. A pipe runs through

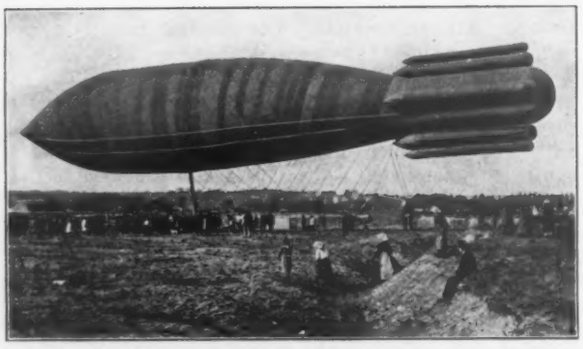


Fig. 3.—Another French Airship, the Ville de Paris.

the bottom of the car, from which the ballast is thrown.

There are two long guide ropes, one attached at the front of the elliptical frame and the other on the car. On landing, the one in front is seized first so as to hold the airship with the head to the wind. The motor may then be stopped and the descent made by pulling down on both guide ropes. A heavy rope, 22 ft. long, weighing 110 lb., is attached on the end of a 164-ft. guide rope. This can be dropped out on landing to prevent coming to the ground too rapidly. The equipment of the car includes a siren, speaking trumpet, carrier pigeons, iron pins and a rope for anchoring the airship, reserve supply of fuel and water, and fire extinguisher.

After being enlarged the Patrie made a number of long trips at an altitude of 2500 to 3000 ft. In November, 1907, she went from Paris to Verdun, near the German frontier, a distance of about 175 miles, in about 7 hr., carrying four persons. This trip was made in a light wind blowing from the northeast. Her course was east, so that the wind was unfavorable. On Friday, November 29, 1907, during a flight near Verdun, the motor stopped, due to difficulty with the carburetter. The airship drifted with the wind to a village about 10 miles away, where she was safely landed. The carburetter was repaired on the 30th. Soon after a strong wind came up and tore loose some of the iron pickets with which the airship was anchored, allowing it to swing broadside to the wind; it then tilted over on the side far enough to let some of the ballast bags fall out. The 150 or 200 soldiers who were holding the ropes were pulled along the ground until directed by the officer in charge to let go. After being released it rose and was carried by the wind across the north of France, the English Channel, and into the north of Ireland. It struck the earth there, breaking off one of the propellers, and then drifted out to sea.

The Republique.

is the latest of the French military dirigible balloons and differs but slightly from the Patrie. The volume has been increased by about 2000 cu. ft. The length has been reduced to 200 ft. and the maximum diameter increased to 35½ ft. The shape of the gas bag accounts for the 2000 additional cubic feet of volume. The motor and propellers are as in the Patrie. The total lifting capacity is 9000 lb., of which 2700 lb. is available for passengers, fuel, ballast, instruments, &c. Its best performance was a 125-mile flight made in 6½ hr. against an unfavorable wind. The material for the gas bag is made up as follows: Outer yellow cotton layer, layer of vulcanized rubber, layer of cotton cloth, and inner layer of rubber. Total weight, 10.48 oz. per square yard.

It is interesting to note the changes which this type has undergone since the first one was built. The Jaune, constructed in 1902-03, was pointed at the rear and had no stability plane there; later it was rounded off at the rear and a fixed horizontal plane attached. Finally a fixed vertical plane was added. The gas bag has been increased in capacity from 80,670 cu. ft. to about 131,000 cu. ft. The manufacturers have been able to increase the strength of the material of which the gas bag is made, without materially increasing the weight. The rudder has been altered somewhat in form. It was first pivoted on its front edge, but later on a vertical axis, somewhat to the rear of this edge. With the increase in size, has come an increase in carrying capacity and consequently a greater speed and more widely extended field of action.

The Ville de Paris.

was constructed for Deutsch de la Meurthe of Paris, who has done a great deal to encourage aerial navigation.

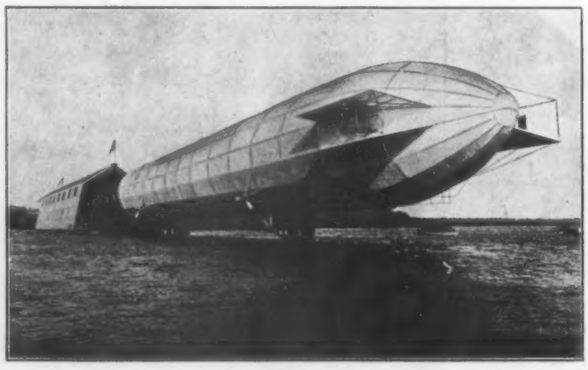


Fig. 4.—The German Airship Zeppelin with Its Floating Hanger.

The first Ville de Paris, built in 1902, was not a success. Its successor was built in 1906, on plans of Surcouf, an aeronautical engineer and balloon builder, based on the France, built in 1884, which the Ville de Paris resembles in many particulars. In September, 1907, Mr. Deutsch offered the use of his airship to the French Government. The offer was accepted, but delivery was not to be made except in case of war or emergency. When the Patrie was lost in November, 1907, the military authorities immediately took over the Deutsch airship.

The gas bag is 200 ft. long, has a maximum diameter of 34½ ft., about three-eighths from the front, and a volume of 112,847 cu. ft. The middle section is cylindrical with conical sections front and rear. At the extreme rear is a cylindrical section with eight smaller cylinders

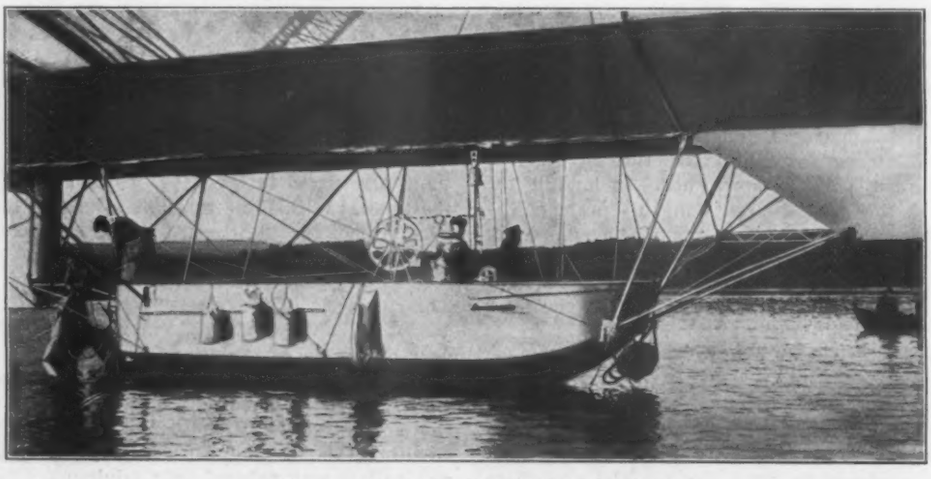


Fig. 5.—One of the Cars of the Zeppelin.

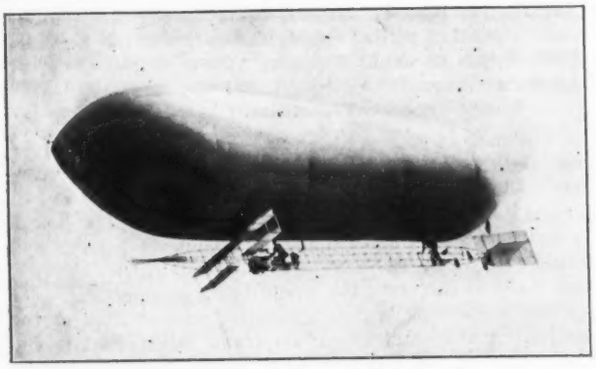


Fig. 6.—The United States Signal Corps Dirigible No. 1.

attached to it. The ballonet has a volume of 21,192 cu. ft., or about one-fifth of the whole volume, and is divided into three compartments, front to rear. The division walls are permeable cloth, and are not fastened to the bottom, so that when the middle compartment fills with air, and the ballonet rises, the division walls are lifted up from the bottom of the gas bag, and there is free communication between the three compartments. The gas bag is made up of a series of strips perpendicular to a meridian line. These strips run around the bag, their ends meeting on the under meridian. This is known as the brachistode method of cutting out the material, and has the advantage of bringing the seams parallel to the line of greatest tension. They are therefore more likely to remain tight and not allow the escape of gas. The disadvantage lies in the fact that there is a loss of 33 1-3 per cent. of material in cutting. The material has approximately the same tensile strength and weight as that used in the Patrie. It differs from the other in one important feature—it is diagonal-thread, that is, the warp of the outer layer of cotton cloth makes an angle of 45 degrees with the warp of the inner layer of cotton cloth. The result is to localize a rip or tear in the material. A tear in the straight thread material will continue along the warp, or the weave, until it reaches a seam.

There are five valves in all, made of steel, about 14 in. diameter; one on the top connected to the car by a cord, operated by hand only; two near the rear underneath. These are automatic, but can be operated by hand from the car. Two ballonet valves directly under the middle are automatic and are also operated from the car by hand. The ballonet valves open automatically at a pressure of 2·3 in. of water; the gas valves open at a higher pressure.

This airship has the long suspension—that is, the weight is distributed along practically the entire length of the gas bag. A doubled band of heavy canvas is sewn with six rows of stitches along the side of the gas bag. Hemp ropes running into steel cables transmit most of the weight of the car to these two canvas bands and thus to the gas bag. On both sides and below these first bands are two more. Lines run from these to points half way between the gas bag and the car, then radiate from these points to different points of attachment on the car. This gives the triangular or nondeformable system of suspension, which is necessary to have the car and gas bag rigidly attached to each other. With this long suspension the Ville de Paris does not have the deformation so noticeable in the gas bag of the Patrie. The car is in the form of a trestle, and is built of wood, with aluminum joints and 0.12 in. wire tension members. It is 115 ft. long, nearly 7 ft. high at the middle, and a little over 5½ ft. wide at the middle. It weighs 660 lb., and is considered unnecessarily large and heavy. The engine and engineer are well to the front; the aëronaut with steering wheels is about at the center of gravity.

The motor is a 70 to 75 hp. Argus, and is exceptionally heavy. The propeller is placed at the front of the car, having the advantage of working in undisturbed air; the disadvantage is the long transmision and difficulty in attaching the propeller rigidly. It has two blades, and is 19.68 ft. long, with a pitch of 26.24 ft. The blades are of cedar, with a steel arm. The propeller makes a maximum of 250 rev. per min. when the engine is making 900 revolutions. Its great diameter and width compensate for its small speed.

Stability is maintained entirely by the cylinders at the rear, four horizontal and four vertical. The volume of the small cylinders is so calculated that the gas in them is just sufficient to lift their weight, so they neither increase or decrease the ascensional force of the whole. The horizontal projection of these cylinders is 1076 sq. ft. The center of this projection is 72 ft. from the center of gravity of the gas. The great objection to this method of obtaining stability is the air resistance due to these cylinders, and consequent loss of speed. The stability of the Ville de Paris in a vertical plane is said to be superior to that of the Patrie because the stability planes of the latter do not always remain rigid. The independent velocity of the Ville de Paris probably never exceeded 25 miles an hour. The rudder has a double surface of 150 sq. ft. placed at the rear end of the car, 72 ft. from the center of gravity. It is not balanced, but is inclined slightly to the rear, so that its weight would make it point directly to the rear if the steering gear should break. Two pairs of movable horizontal planes,

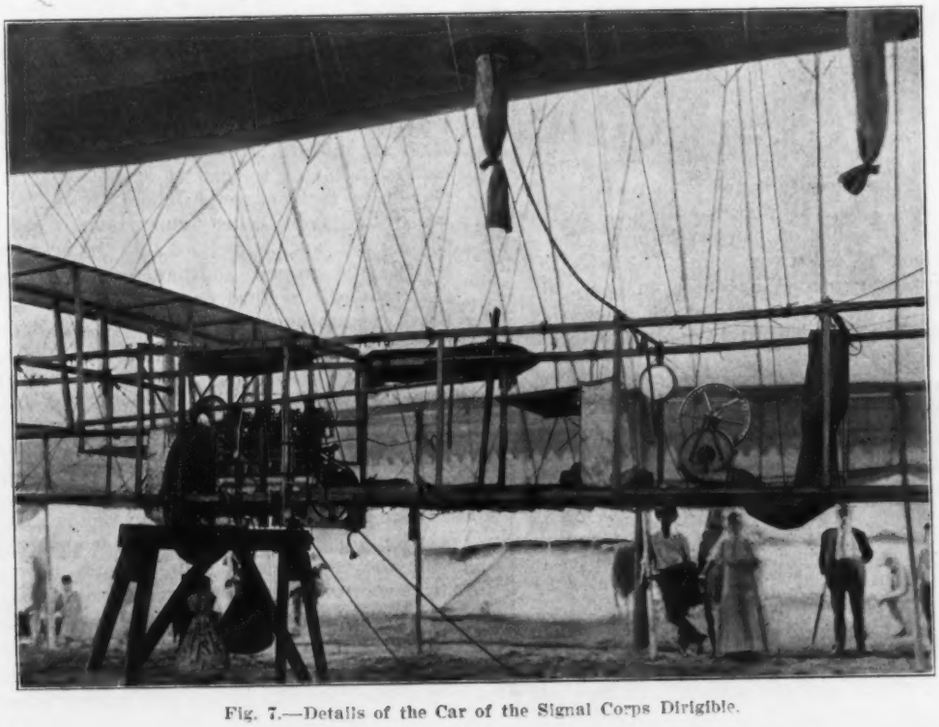


Fig. 7.—Details of the Car of the Signal Corps Dirigible.

one at the rear of the car having 43 sq. ft., and one at the center of gravity having 86 sq. ft., serve to drive the airship up or down without losing gas or ballast. A 400-ft. guide rope is attached at the front end of the car and a 230-ft. guide rope at the center of gravity.

About 30 men are required to maneuver the Ville de Paris on the ground. The pilot has three steering wheels, one for the rudder and two for the movable horizontal planes. The instruments used are an aneroid barometer, a registering barometer giving hights up to 1600 ft. and an ordinary dynamometer, which can be connected either with the gas bag or ballonet by turning a valve. A double column of water is also connected to the tube to act as a check on the dynamometer. Due to the vibration of the car caused by the motor, these instruments are suspended by rubber attachments. Even with this arrangement it is necessary to steady the aneroid barometer with the hand to read it. The vibration prevents the use of the statoscope.

England's Military Dirigible No. 1.

The gas bag of this airship is made of eight layers of gold beater's skin, is cylindrical in shape with spherical ends and has a volume of 84,768 cu. ft., length of 111½ ft., and maximum diameter of 31½ ft. There is no ballonet, but due to the toughness of the gold beater's skin a much higher pressure can safely be maintained than in gas bags of rubber cloth. Without a ballonet, however, it would not be safe to rise to the hights reached by the Patrie. The valves are made of aluminum and are about 12 in. diameter.

This airship has a long suspension with a short boat-shaped car, a combination much to be desired, as it distributes the weight over the entire length of the gas bag and gives the best form of car for purposes of observation and for maneuvering on the ground. To obtain this combination they had to construct a heavy steel framework, which cuts down the carrying capacity, and adds greatly to the air resistance. This is the only airship in Europe having a network to support the car. In addition, four silk bands are passed over the gas bag, and wires run from their extremities to the steel frame. This steel frame is in two tiers; the upper is rectangular in cross section and supports the rudder and planes, the lower part is triangular in cross section and supports the car. The joints are aluminum. The car is of steel, is about 30 ft. long, and to reduce air resistance is covered with cloth.

A 40 to 50 hp. eight-cylinder Antoinette motor is used, set up on top of the car. The benzine tanks are supported above in the framework. Gravity feed is used. There are two aluminum propellers, one on each side, with two blades each, 10 ft. diameter, and making 700 rev. per min. The transmission is by belt.

Stability is maintained by planes. At the extreme rear is a large fixed horizontal plane; in front of this a pair of hinged horizontal planes, and under this the hexagonal shaped balanced rudder. Two pairs of movable horizontal planes, 8 x 4 ft. each, at the front serve to guide the airship up and down. These planes have additional inclined surfaces intended to increase the stability in a vertical plane. All planes, both fixed and movable, are of silk stretched on bamboo frames. The speed attained is about 16 miles per hour. This airship with a few improvements added has been in operation the past few months. The steel framework connecting the gas bag to the car is now entirely covered with canvas, which must reduce the resistance of the air very materially. The canvas covering inclosing the entire bag serves as a reinforcement to the latter, and at the same time gives attachment to the suspension underneath. It is reported that a speed of 20 miles an hour has been attained with the reconstructed airship. A pyramidal construction similar to that on the Patrie has been built under the center of the car to protect the car and propellers on landing. A single movable horizontal plane, placed at the front end of the car and operated by the pilot, controls the vertical motion.

Three different types of airships are being developed in Germany. The Gross is the design of Major Von Gross, who commands the Balloon Battalion at Tegel, near Berlin. The Parseval is being developed by Major Von Parseval, a retired German officer, and the Zeppelin is the design of Count Zeppelin, also a retired officer of the German Army.

The Gross.

The first airship of this type made its first ascension July 23, 1907. The gas bag is made of rubber cloth, similar to that used in the Ville de Paris. It is diagonal-thread, but there is no inner layer of rubber. The length is 131¼ ft.; maximum diameter, about 39 1-3 ft., and volume 63,576 cu. ft. The form is cylindrical with spherical cones at the ends, the whole being symmetrical.

The suspension is practically the same as that of the Patrie. A steel and aluminum frame is attached to the lower part of the gas bag, and the car is suspended on this by steel cables. The objection to this system is even more apparent in the Gross than in the Patrie; a marked dip along the upper meridian of the gas bag shows plainly the deformation. The car is boat shaped and is suspended 13 ft. below the gas bag.

The motor is a 20 to 24 hp. 4-cylinder Daimler-Mercedes. There are two two-blade propellers 8.2 ft. diameter, placed one on each side, but well up under the gas bag near the center of resistance. The transmission is by belt. The propellers make 800 rev. per min. At the rear of the rigid frame attached to the gas bag, are two fixed horizontal planes, one on each side. A fixed vertical plane runs down from between these horizontal planes, and is terminated at the rear by the rudder. A fixed horizontal plane is attached on the rear of the gas bag. The stability in a vertical plane is reported to be very good, but it is said to veer considerably in attempting to steer a straight course.

As first built, the Gross had a volume of 14,128 cu. ft. less than at present, and there was no horizontal plane at the rear of the gas bag. Its maximum speed is probably 15 miles per hour. As a result of his experiments of 1907, Major Von Gross has this year produced a perfected airship built on the same lines, but with greatly increased volume and dimensions. The latest one has a volume of 176,000 cu. ft., is driven by two 75-hp. Daimler motors, and has a speed of 27 miles per hour. On September 11 of this year, this airship left Berlin at 10.25 p. m., carrying four passengers, and returned the next day at 11.30 a. m., having covered 176 miles in the period of a little over 13 hr. This is the longest trip, both in point of time and distance ever made by any airship returning to the starting point.

The Parseval.

The Parseval has a gas bag similar in construction to that of the Drachen balloon, used by the army for captive work. Its volume is 113,000 cu. ft., length 190 ft., and maximum diameter 30½ ft. It is cylindrical in shape, rounded at the front end and pointed at the rear. The material is diagonal thread, weighing about 11.2 oz. per square yard and having a strength of about 940 lb. per running foot. Its inner surface is covered with a layer of rubber. There are two ballonets, one at each end, each having a capacity of 10,596 cu. ft. The material in the ballonet weighs about 8¼ oz. per square yard, the cotton layers being lighter than in the material for the gas bag. Air is pumped into the rear ballonet before leaving the ground, so that the airship operates with the front end inclined upward. The air striking underneath, exerts an upward pressure, as on an aeroplane, and thus adds to its lifting capacity. Air is pumped into the ballonets from a fan operated by the motor. A complex valve just under the middle of the gas bag enables the engineer to drive air into either or both ballonets. The valves also act automatically and release air from the ballonets at a pressure of about 0.9 in. of water. In the middle of the top of the gas bag is a valve for releasing the gas. It can be operated from the car and opens automatically at a pressure of about 2 in. of water. Near the two ends and on opposite sides are two rip strips controlled from the car by cords.

The suspension is one of the characteristics of the airship and is patented. The car has four trolleys, two on each side, which run on two steel cables. The car can run backward and forward on these cables, thus

changing its position with relation to the gas bag. This is called loose suspension. Its object is to allow the car to take up, automatically, variations in thrust, due to the motor, and variations in resistance, due to the air. Ramifications of hemp rope from these steel cables are sewn to a canvas strip, which in turn is sewn to the gas bag. This part of the suspension is the same as in the Drachen balloon. The weight is distributed over the entire length of the gas bag.

The car is 16.4 ft. long and is built of steel tubes and wire. It is large enough to hold the motor and three men, though four or five may be taken. The motor is a 110-hp. Daimler-Mercedes. Sufficient gasolene is carried for a run of 12 hr. The propeller, like the suspension, is peculiar to this airship and is protected by patents. It has four cloth blades which hang limp when not turning. When the motor is running these blades, which are carefully weighted with lead at certain points, assume the proper position due to the various forces acting. The diameter is 13¾ ft. The propeller is placed above the rear of the car near the center of resistance. Shaft transmission is used. The propeller makes 500 rev. per min. to 1000 of the motor. There is a space of 6½ ft. from the propeller blades to the gas bag, the bottom of the car being about 30 ft. from the gas bag. This propeller has the advantage of being very light. Its position, so far from the engine, necessarily incurs a great loss of power in transmission. The steering wheel at the front of the car has a spring device for locking it in any position.

The Zeppelin.

The Zeppelin airship, of which there have been four, differs from all others in that the envelope is rigid. Sixteen separate gas bags are contained in an aluminum alloy framework having 16 sides, covered with a cotton and rubber fabric. The pressure of the air is taken up by this framework instead of by the gas bags. The gas bags are not entirely filled, thus leaving room for expansion. The rigid frame is 446 ft. long, 42½ ft. in diameter, and has ogival-shaped ends. It is braced about every 45 ft. by a number of rods crossing near the center. Vertical braces are placed at intervals the entire length of the frame. The 16 gas bags are completely separated from each other by partitions of sheet aluminum. Under the framework is a triangular truss running nearly the entire length, the sides of the triangle being about 8 ft. The total volume of the gas bags is 460,000 cu. ft. which gives a gross lift of about 32,000 lb.

The two cars are built like boats and are rigidly attached directly to the frame of the envelope, and a very short distance below it. They are about 20 ft. long, 6 ft. wide, 3½ ft. high, are placed about 100 ft. from each end and are made of the same aluminum alloy. To land the airship, it is lowered until the cars float on the water, when it can be towed like a ship. A third car is built into the keel directly under the center of the framework, and is for passengers only.

The power is furnished by two 110-hp. Daimler-Mercedes motors, one on each car. Each weighs about 550 lb.; sufficient fuel for a 60-hr. run can be carried. A pair of three-bladed metal propellers about 15 ft. in diameter is placed opposite each car, firmly attached to the frame of the envelope at the hight of the center of resistance where they are most efficient. In addition to the long V-shaped keel under the rigid frame, on each side at the rear of the frame are two nearly horizontal planes, while above and below the rear end are vertical fins. A large vertical rudder is attached at the end of the rigid frame, and an additional one is placed between each set of horizontal planes on the sides. For vertical steering, there are four sets of movable horizontal planes placed near the ends of the rigid frame, about the hight of the propellers. Each set consists of four horizontal planes placed one above the other and connected with rods, so that they work on the principle of a shutter. These horizontal rudders serve another very important purpose, due to the reaction of the air. When these planes are set at an angle of 15 degrees and the airship is making a speed of 35 miles per hour, an upward pressure of over 1700 lb. is exerted, and consequently all the gas in one compartment could escape and yet by the manipulation of these planes, the airship could return safely to its starting point.

Its best performances were two long trips made during the past summer. The first, July 4, lasted exactly 12 hr., during which time it covered a distance of 235 miles, crossing the mountains to Lucerne and Zurich, and returning to the balloon house at Friedrichshafen on Lake Constance. The average speed on this trip was 32 miles per hour. On August 4 this airship attempted a 24-hr. flight, which was one of the requirements made for its acceptance by the government. It left Friedrichshafen in the morning with the intention of following the Rhine as far as Mainz, and then returning to its starting point straight across the country. A stop of 4 hr. and 30 min. was made in the afternoon of the first day on the Rhine, to repair the engine. On the return, a second stop was found necessary near Stuttgart, due to difficulties with the motors and the loss of gas. While anchored to the ground a storm came up, and broke loose the anchorages; and as the balloon rose in the air it exploded and took fire, due to causes which have never been actually determined and published, and fell to the ground, resulting in its complete destruction. On this journey, which lasted in all 31 hr. and 15 min., the airship was in the air 20 hr. and 45 min., and covered a total distance of 378 miles.

The patriotism of the German nation was aroused. Subscriptions were immediately opened and in a short time $1,000,000 had been raised. A Zeppelin Society was formed to direct the expenditure of this fund; $85,000 has been expended for land near Friedrichshafen; shops are being constructed and it has been announced that within one year, the construction of eight airships of the Zeppelin type will be completed. The German Association for an Aerial Fleet has been organized in sections throughout the country, which announces its intention of building 50 garages (hangars) for housing airships.

United States Signal Corps Dirigible No. 1.

Due to lack of funds, the United States Government has not been able to undertake the construction of an airship sufficiently large and powerful to compete with those of European nations. However, specifications were sent out last January for an airship not over 120 ft. long and capable of making 20 miles per hour. Contract was awarded to Capt. Thomas S. Baldwin, who delivered an airship last August to the Signal Corps. The gas bag is spindle shaped, 96 ft. long, maximum diameter 19 ft. 6 in., with a volume of 20,000 cu. ft. A ballonet for air is provided inside the gas bag, and has a volume of 2800 cu. ft. The material for the gas bag is made of two layers of Japanese silk, with a layer of vulcanized rubber between. The car is of spruce, and is 66 ft. long, 2½ ft. wide and 2½ ft. high. The position of the car very near to the gas bag, is one of the features of the Government dirigible. This reduces the length and consequently the resistance of the suspension, and places the propeller thrust near the center of resistance.

The motor is a 20-hp. water-cooled Curtiss make. The propeller is at the front end of the car, and is connected to the engine by a steel shaft. It is built up of spruce, has a diameter of 10 ft. 8 in., with a pitch of 11 ft., and turns at the rate of 450 rev. per min. A fixed vertical surface is provided at the rear end of the car to minimize veering, and a horizontal surface attached to the vertical rudder at the rear tends to minimize pitching. A double horizontal surface controlled by a lever and attached to the car in front of the engine, serves to control the vertical motion and also to minimize pitching.

The total lifting power of this airship is 1350 lb., of which 500 lb. is available for passengers, ballast, fuel, &c. At its official trials a speed of 19.61 miles per hour was attained over a measured course, and an endurance run lasting 2 hr., during which 70 per cent. of the maximum speed was maintained. Dirigible No. 1, as this airship has been named, has already served a very important purpose in initiating officers of the Signal Corps in the construction and operation of a dirigible balloon. With the experience now acquired, the United States Government is in a position to proceed with the construction and operation of an airship worthy of comparison with any now in existence, but any efforts in this direc-

tion must await the action of Congress in providing the necessary funds.

In anticipation of taking up the subject of aeronautics on a scale commensurate with its importance, a complete plant has been constructed at the Signal Corps post at Fort Omaha, Nebraska. This plant comprises a steel balloon house 200 ft. long, 84 ft. wide and 75 ft. high; that is, large enough to house a dirigible balloon of the size of the new French Military airship Le Republique. For furnishing hydrogen gas, an electrolytic plant nas been installed capable of furnishing 3000 cu. ft. of gas per hour. A gasometer of 50,000 cu. ft. capacity has been provided to store a sufficient supply of gas for emergencies. In connection with the hydrogen plant, is a compressor for charging under pressure the steel tubes in which the gas is transported. A hydraulic pump for testing steel tubes at high pressure is a part of this equipment. A steel wireless telegraph tower 200 ft. high has been completed, and probably will be used in connection with wireless experiments with dirigible balloons.

(To be continued.)

Canadian Opinion Against Bounties.

TORONTO, November 28, 1908.—At the annual meeting of the Dominion Grange, held in Toronto this week, resolutions were passed in favor of tariff reduction and of abandonment of the iron and steel bounties. It was recommended that the tariff be lowered gradually and by a certain definite annual percentage. Satisfaction was expressed that, in spite of the efforts of the Canadian Manufacturers' Association, there had been no increase in the duties during the year. Apparently the fact was overlooked that the dumping duty was applied to tin plate within the year. Previously Canadian makers of this commodity had not the benefit of the dumping duty, the Government taking the ground that the home output of tin plate was not sufficient to supply the home demand. It is contended even now by consumers that the home supply is inadequate in the matter of quantity. The Grange further recommends that any advances on the part of the United States for freer trade relations be met in a friendly spirit. On the subject of bounties and bonuses the Grange puts its views on record in the following words:

We believe that this practice has a strong tendency to corrupt not only the management and organization of the companies interested, but the political life of the nation. In this regard we would particularly urge that the bounties on iron and steel be discontinued entirely at the end of the term they are granted for, and that no further additions should be made in future to the list of bounty-fed industries. We would also condemn the using of the people's money in the bonusing of an all-red line of fast passenger steamships. We do not believe this project would be of any material advantage to the nation at large.

Bounties on Imports.

In this country as well as in Great Britain, opponents of the rail dumping business are arguing that the public aiding of that business is contrary to the intention of the law. In the Customs act amendment of last year it is provided as follows:

Every person who desires to export any article manufactured in Canada which is subject to a bounty from the Government of Canada when for home consumption and not for exportation, including steel blooms and steel billets made in Canada, shall file his written application with the collector at the nearest custom house for permission to export the same. Such application shall be accompanied by the affidavit of a person having a knowledge of the facts, setting forth and describing the articles proposed to be exported and establishing to the satisfaction of the collector that bounty has not been paid and will not be claimed on or in respect of the said described articles, or if bounty has been paid thereon or in respect thereof, that the sum has been refunded to the Government. The collector may then grant his permission for the exportation of the said described articles. If any such articles be laden in any railroad carriage or other vehicle or vessel for the purpose of being exported, without the permission of the collector of customs as aforesaid, the same shall be seized and forfeited.

It is held that the words "any article manufactured in Canada when for home consumption and not for exportation, including steel blooms and steel billets made in Canada," are all inclusive so far as articles subject to bounty are concerned. The substance of the steel blooms and steel billets, it is maintained, acquires no rights or immunities in the finished rail state that it did not have in the bloom or billet state. At all events, it is contended, the framers of this amendment intended that exportation of rails should involve forfeiture of bounties to which the constituent steel in a cruder stage was otherwise entitled. If this view of the intention of the framers of the law is right, it is to be expected that in the next session of Parliament verbal changes to give more accurate expression to that intention will be made in the law. Some years ago, it will be remembered, through looseness of language, the bounty law so overran the intention of Parliament as to provide for a bounty on steel rails. When tested in the courts it was found that the "rolled structural prices" of the act was broad enough to include rails. In the session following the Exchequer Court's decision the law was amended so as to exclude rails. It is thought not improbable that the bounty act may be amended in a purely definitive way to bar the payment of bounties on exported articles or the constituent material in them.

Another class of articles which is regarded as on the same footing as rails is that of agricultural implements. These, it is declared, have in their composition iron and steel in which bounties have been paid. They should therefore, it is held, be used in Canada and not exported, or, if exported, the bounty on the material in them should be handed back to the Government. Sight is apparently lost of the fact that for harvesters, binders, reapers and mowers made in Canada, iron and steel are practically free of duty, as all but 1 per cent. of the duty is refunded. Hence the manufacturers of these articles get their iron and steel at prices that are free of the bounty charge.

It has been stated by the president of the Dominion Iron & Steel Company that the export business of his company is profitable irrespective of the bounties. If so, the fact will count as a formidable argument for the reduction of the rail duty as well as the removal of the bounties. There are hints that the reason for the company's aggressiveness in export markets is the desire to be admitted to the international rail pool. C. A C. J.

Hardness and Wear of Steel Rails.

In discussing the relative hardness and wear of open hearth and Bessemer rails and of manganese steel rails the *Railroad Age Gazette* says that experience with open hearth rails having as low as 0.04 per cent. phosphorus with low carbon shows that, while these rails are very tough and easily meet the drop test, they do not wear well, especially on curves. It suggests that specifications for open hearth rails should therefore provide for a higher carbon content than that used in Bessemer rail specifications. Experiment has indicated, it is said, that such rails may have 0.8 or 0.9 carbon and yet be used with safety. The desideratum is a rail with such a relation between phosphorus and carbon as will give both toughness and hardness. It should be said, however, that the data on this subject are not sufficient for definite deduction. The position taken by the manufacturers in their conferences last year with the railroad engineers was that present knowledge is not sufficient to warrant such high carbons as are indicated above, and that the railroads should advance cautiously in requirements designed to secure both maximum resistance to wear and minimum liability to breakage from brittleness. As suggested by the *Railroad Age Gazette*, the use of some alloy that would result in the maximum of wearing quality and at the same time the maximum toughness has been considered, but the high cost of such rails has been the chief obstacle. Our contemporary in referring to the necessity of a careful study of the relation between hardness and wear in steel rails describes the well-known methods for measuring hardness as well as some of the apparatus that has been devised for measuring wear. Reference is made to the extraordinary wear shown in the experience of the Boston Elevated Railroad, where low carbon Bessemer rails on an 82-ft. curve were worn out in 44 days, while hard manganese

cast steel rails have been in service over six years on the same curve with a reduction in hight of but 0.46 in. and are still in use.

Our contemporary gives the following description of the Pennsylvania Steel Company's machine, recently exhibited at Atlantic City, designed for testing the wearing qualities of rails on sharp curves and for measuring accurately the values of different grades of steel in resisting wear:

A circular track 20 ft. in diameter is composed of three equal lengths of rail, 100-lb. section, connected by standard fastenings, each length of rail being a different grade of steel. Two 33-in. car wheels having independent axles mounted in bearings on a heavy revolving beam are supported by the test rails. A large center pin is used to transmit power to the revolving arm through bevel gearing directly connected to a 50-hp. electric motor. A compression spring on top of the arm exerts a vertical pressure up to 60,000 lb. through each car wheel. Lateral pressure of the wheel flange against the rail up to 15,000 lb. is produced by means of compression springs mounted on the axle of each wheel. The maximum speed is 85 rev. per min., corresponding to about 60 miles per hour. By the use of the machine wear equivalent to one week's service on the Pennsylvania Horse Shoe curve can be obtained in one day. The principal use of the machine has been to show the remarkable wear of very hard manganese steel rolled rails made by the Manard process. These rails are so tough that a 100-lb. section 33 ft. long can be given two complete twists so that the rail head is wrapped around the flange. They will stand repeated drop tests until bent into a V shape without fracture, and their great ductility its indicated by a tensile strength of 150,000 lb. and an elongation of 50 per cent. in 8 in. The tests of the wearing qualities of these very hard and tough rails on the machine above described indicate that a service equal to six times that of ordinary Bessemer rails may be expected.

From the information thus far obtained as to the behavior of open hearth steel rails it is probable that there may be some disappointments due to their rapid wear, especially on curves, and where the carbon content is too low, and the next complaint to be made to the rail maker will relate to soft rails and low service. It is also reasonably certain that open hearth rails containing low phosphorus can be used with safety when they contain as high as 0.9 carbon and that the service obtained from them on sharp curves will be at least double that rendered by much of the low carbon open hearth steel which has been rolled this year. If these conclusions are correct it would seem that the interest of the railroads should not be confined to the mere price of rails per ton, but they should be more concerned in obtaining such intelligent specifications and inspection for open hearth rails as will secure the largest amount of service from a dollar's worth of steel.

The Armstrong Knurling Tool.

Exclusive of the knurls and pins there are only two pieces in the knurling tool recently brought out by the Armstrong Bros. Tool Company, 104 North Francisco avenue, Chicago. The tool is described as self-centering,

The New Knurling Tool Made by the Armstrong Bros. Company, Chicago.

strong, convenient and efficient, and has an extra large bearing surface to take both the end and the side thrust.

It is regarded as essential to the long life of a knurling tool and uniform work produced by it that the self-centering arrangement shall have as little lost motion as possible. Another necessary point is that the knuckle or joint must have ample bearing to resist the severe strains which are due to end and side thrust. It is in both of these particulars that the tool is considered to be noteworthy. At the same time its general design, quality of material and workmanship are declared to be of the best. The knurls and pins are of tool steel, tempered, and all other parts are drop forged, or are of bar steel hardened.

The No. 1-K size, of which an illustration is given, has a shank ½ x 1⅛ in., and can be furnished with either coarse, medium or fine knurls.

The Peerless Multiple Spindle Automatic Lathe.

Front and rear views of the multiple spindle automatic lathe, which is being brought out by the Peerless Automatic Machine Company, Cleveland, Ohio, are shown in Figs. 1 and 2. The headstock carrying the spindle head and the bed frame is cast as one piece to secure rigidity. This bed frame rests at three points upon a pan, which catches the cutting lubricant, chips and product, and from it the lubricant is strained and drained into the pedestal which supports the spindle end of the machine and forms a reservoir.

Power is supplied to the stock carrying spindles and the thread cutting spindles by the pulley shown at the left in Fig. 2 through the central power shaft. The operating and regulating cams are driven by the high speed pulley perpendicular to the cam shafts. All means of adjustment are on the outside of the machine where they are readily accessible.

The wire feed adjusting bar carrying the adjusting screw is shown at the left in Fig. 1. Next in order proceeding toward the right are the spindle head locking bolt, with its tension spring and adjusting nut, the adjusting screw and stop screw for the front traverse tool slide, the stock length gauge with the adjusting screw at the right end of the longitudinal tool slide, and the squared end of the driving worm shaft to receive a crank handle, by which the machine may be operated by hand while setting the tool.

The disk next to the bed frame at the right of Fig. 1 carries the cams which regulate the thread cutting spindles. Next to it are the speed regulating dogs which control the slow cutting speeds and the rapid return feeds and other intervening movements. In Fig. 2 the thread cutting spindles are shown in front of the horizontal tool slide with all adjustable parts conveniently placed. The adjusting screw and the stop screw for the rear transverse tool slide and the adjustable operating cam for both transverse tool slides appear near the middle of Fig. 2. Further attention to accessibility is shown by the unobstructed space reserved for the tools to be secured to the longitudinal and transverse tool slides. The oil pump shown to be belt driven is now gear connected to the worm driving shaft.

The spindle head carries five spindles made of crucible steel which run in phosphor-bronze bearings; the front bearings have the standard taper form, with means of compensating for wear. Oil is supplied to the spindle bearings by a double system of lubrication. The oil chambers, *a* and *b*, Fig. 3, between the front and rear bearings are provided with means for filling independent of the glass oilers shown in Figs. 1 and 2, although the oil from these oilers drains into the oil chambers after passing through the bearings and helps to keep them filled.

The stock chucking and feeding mechanism are very similar to those that have now become standard for machines of this class. The adjustment of the stock feed operates through the adjusting bar and the adjusting screw shown in Fig. 1. This adjusting bar introduces a greater or less amount of lost motion between the feeding lever shown at the right of Fig. 2 and the cam roll lever directly to its left, so that the feeding cam need never be removed or adjusted. Since the stock feeding is effected while the cutting tools are operating, no time is lost because of this lost motion.

The locking of the spindle head into position after each partial revolution is effected by a novel and improved locking bolt. Unlike the locking bolts previously used, the accurate positioning of the spindle does not depend upon the nicety of the fit that the cylindrical part

of the locking bolt has in the locking bushing *e*. The tapered end of the locking bolt engages a conical recess divided on the longitudinal axis. One-half of this divided recess is integral with the locking bushing *e;* the other half is formed by the plugs *d* carried by the spindle head and brought successively into juxtaposition with the locking bushing *e* at the end of each partial revolution of the spindle head. It will be seen that the locking bolt will lock the spindle head accurately and effectively even though it should fit quite loosely into the cylindrical part of the locking bushing *e*. It is kept in place by the tension spring and withdrawn by means of the lever and cam shown in Fig. 3.

The intermittent rotation of the spindle head is accomplished by a sprocket wheel integral with the spindle head connected by a chain with a sprocket wheel carried by the cam drum at the extreme right in Fig. 2, which is started and stopped through the agency of a clutch pawl carried by the cam drum and a cam secured to the bed frame to operate the pawl. The operation of this mechanism is clearly shown in Fig. 3. The idle position of the pawl is shown at *f* and the operating position at *g*.

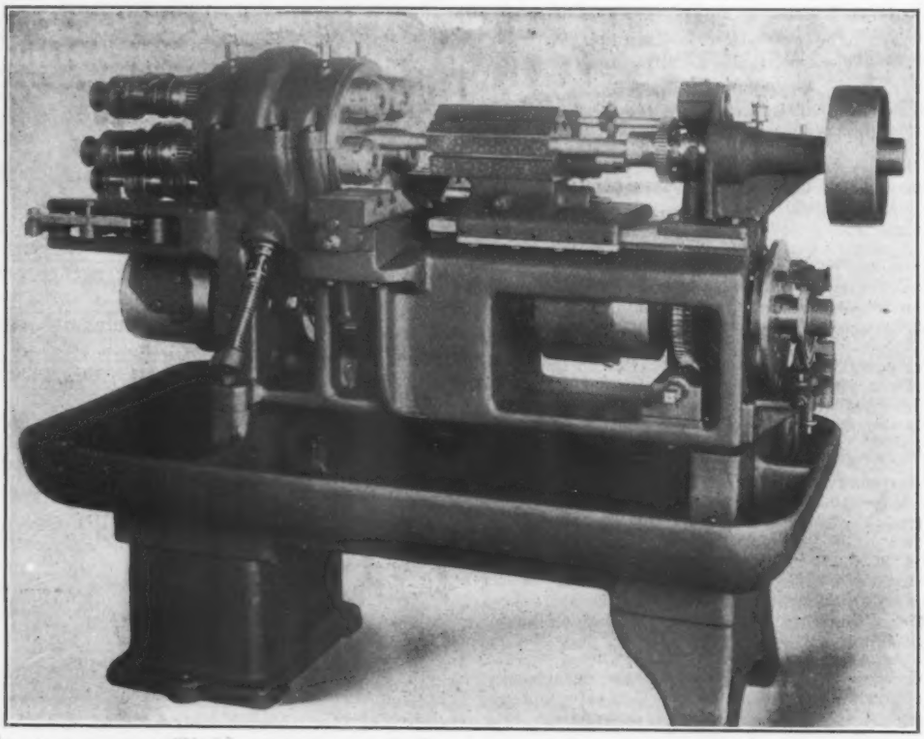


Fig. 1.

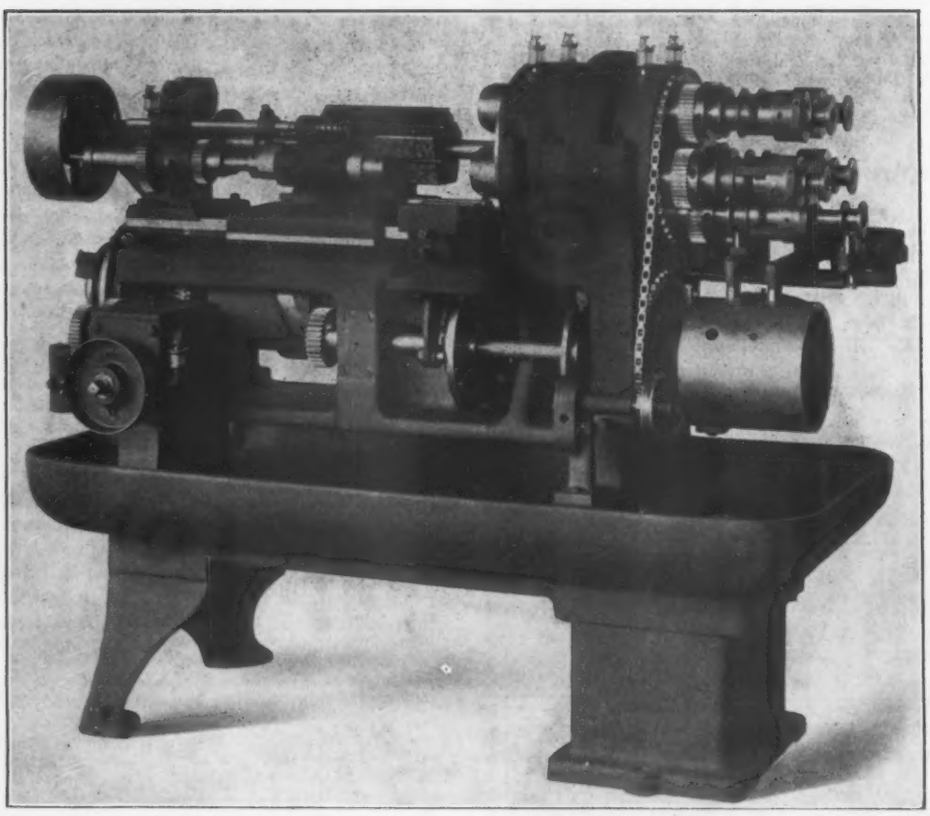


Fig. 2.

The New Multiple Spindle Automatic Lathe Built by the Peerless Automatic Machine Company, Cleveland, Ohio.

This pawl has easy and smooth engaging and disengaging action and locks the sprocket to the cam drum while it travels over the concentric part of cam *h* and through the chain revolves the spindle head.

The transverse tool slides are operated by racks, segment gear levers and the cams carried by the cam disk. The racks are adjusted by the adjusting screws previously referred to. The operation of the longitudinal tool slide is self-explanatory as shown in Figs. 1 and 2, and the method of securing the cutting tools thereto is plainly shown in Fig. 4. One or more tools can be secured to each tool carrying face of the tool slide, and may be adjusted backward or forward to suit requirements. It will be noticed that the familiar form of overhanging box tools, &c., have been dispensed with.

The cutting of threads, either male or female, is accomplished by revolving the threading spindles in the same direction as the stock, but at a slower speed. The threading tools are released or backed off by rotating them in the same direction as the stock, but at a greater speed. This arrangement makes it possible to cut threads at about one-third of the peripheral speed used for the cutting tools, and does not necessitate the stopping and starting of any of the revolving parts.

Facilities for using two threading spindles are provided, although but one is shown in Fig. 2. The second

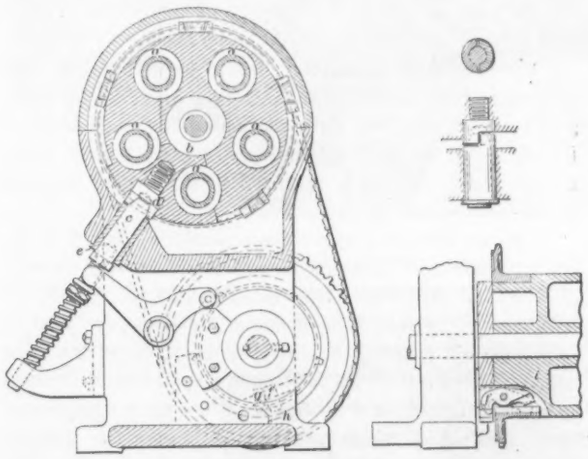


Fig. 3.—Details of the Spindle Head and Locking Mechanism.

or auxiliary threading spindle is placed directly above the one shown and operates in the same manner, so that two dies, two taps, or a tap and a die may be used. Both threading spindles can be independently adjusted and timed to cut any length of thread within the capacity of the machine and are withdrawn from the work without reference to the position of the tool slides.

Change gears which supply 10 different rates of feed to the cutting tools varying from 0.004 to 0.026 in. per revolution of the stock spindle are provided, but the fast

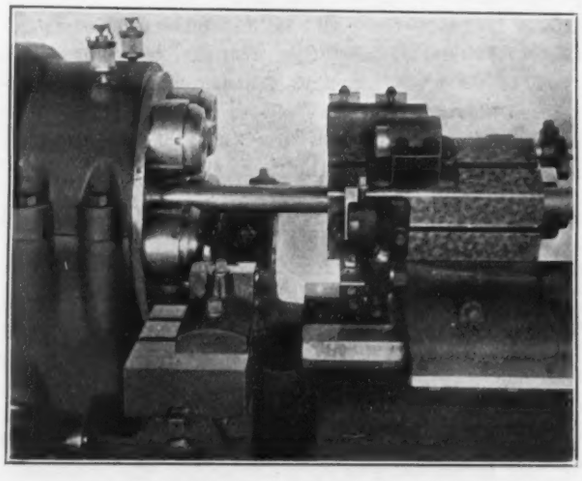


Fig. 4.—The Longitudinal Tool Slide, Showing Manner of Securing the Cutting Tools.

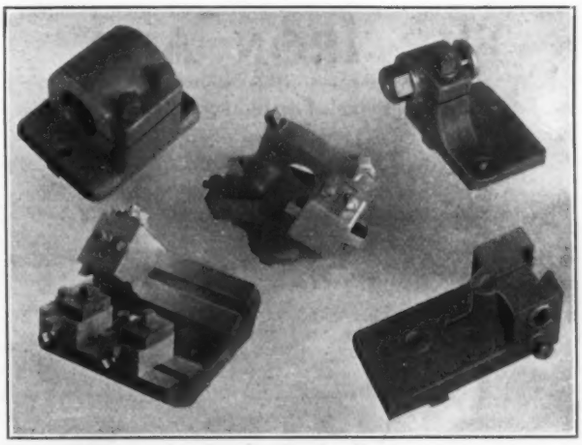


Fig. 5.—Group of Standard Tool Holders.

motion for returning the tools and indexing and locking the spindle head is constant, irrespective of the cutting feeds. The feed can at any time be instantly thrown out of operation and securely locked in this position, so that the machine may be hand operated without danger of having the feed accidentally engaged.

Fig. 5 shows a group of standard tool holders, including a holder for round tools such as drills, countersinks, centering tools, reamers, hollow mills, &c., a circular tool holder, a single rough turner, a compound finishing turner and a forming tool holder. The machine illustrated has a capacity of 1 in. diameter by 5 in. long. Machines of less or greater capacity can be furnished.

The Inland Steel Company's Bonds.

Eversz & Co., Chicago, having sold $2,000,000 of the bonds to investors, including the largest banks in Chicago, offer the unsold portion of $3,000,000 first mortgage 6 per cent. gold bonds of the Inland Steel Company, Chicago, dated April 1, 1908, maturing serially $150,000 per annum to April 1, 1928. The interest is payable April 1 and October 1. The First Trust & Savings Bank, Chicago, is trustee. A circular issued by the bankers says in substance:

"The bonds are a first and closed lien on all the properties of the company, consisting of iron ore properties on the Mesaba range, Minnesota, blast furnaces, harbor, docks, real estate, steel works, sheet and finishing mills, &c., at Indiana Harbor, Ind., on Lake Michigan, near Chicago, and at Chicago Heights, Ill., representing a cash investment of $7,184,752.

"The net cash and quick assets of the company, in addition to above assets, amount to $2,126,621, the total security under this mortgage, therefore, aggregating $9,311,373. The trust deed securing the mortgage provides that the net cash and quick assets of the company over and above its liabilities, other than the aggregate amount of the bonds outstanding, shall not be less than $1,500,000 until the issue is reduced to $1,500,000, and thereafter never less than the amount of unmatured bonds.

"Surplus earnings from the beginning of operations have been satisfactory and increasing each year—except for the year ending June 30, 1908, that period covering the recent depression, when earnings, even under the adverse conditions then obtaining, were three and one-half times the interest charges. These surplus earnings for the last three years, after payment of all charges, including interest on bonds, as officially reported, were as follows:

"Year ending June 30, 1906, $860,766; in 1906-1907, $984,323; in 1907-1908, $651,842. Net earnings for the current fiscal year, on the basis of earnings reported for the first quarter, will be larger than any previous year. The products of the company, being of a diversified and stable character, earnings are assured, even in periods of greatest business depression, more than sufficient to meet fixed charges and sinking fund requirements."

THE IRON AGE

Established in 1855.

New York, Thursday, December 3, 1908.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY, - - - - - PUBLISHER
14-16 PARK PLACE, NEW YORK

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We conclude in this issue of *The Iron Age* what is practically a verbatim report of the statements made before the Ways and Means Committee of the House of Representatives by the iron and steel manufacturers. The publication last week on the day after the hearing of a telegraphic report covering eight pages and a half, or about 14,000 words, is a feat in trade journalism never before accomplished in this country. It was possible only by securing a direct Western Union wire, the services of four operators at the receiving end, and by keeping the pages open until midnight. The operations of printing, binding, trimming and mailing had to follow before the "book," as it is often called, was ready to begin its journey to the subscribers of *The Iron Age*.

"Normal" Cost of Iron and Steel.

To get a basing point is one of the chief difficulties encountered in any discussion of cost and profits of manufacturing iron and steel in the United States. If the particular time at which the reckoning is made finds all the plants in the country working at high pressure, with labor scarce and deliveries of rolling mill products far behind, it is customary to say that the conditions are abnormal; that if times were "normal," tonnage and profits would be scaled down, even though costs might be reduced at the same time. Conversely, in a year like 1904, as demand shrinks and overhead charges per ton run up while market prices of product fall, there comes a serious diminution of profits. Again the conditions are called abnormal, both as regards costs and selling prices. This time "normal" may be taken to mean increased output, higher market prices and better profits, presumably with some increase in cost of raw materials and labor.

In all such comparisons it is assumed that there is a definite cost line to which the mutations of the market are referable and which if it could be found might be known as the country's competitive index number in iron and steel. The history of the iron trade shows, however, that not only are there variables in the general situation from year to year—the mutations in crops, in the supply of money, the production of gold, the supply of confidence, the number of uses for iron and steel, and a score of other things—but that costs vary greatly as between different producers and different sections. The discussions in other years were more voluminous than of late (the lines of the industry being now more settled) as to the most economical situs for the assembling of the raw materials of pig iron manufacture in the United States. But the ground is still traversed whenever an important new plant is built and each time comparisons must be made with the facts, so far as they are available in a general way, relative to the possibilities at conspicuous established plants.

It is the common belief that much more is known by the general public to-day than at any other time about the costs and profits of steel making in the United States, since so many thousands of investors own shares in the steel companies. Yet a study of the statements of these companies shows wide divergence in profits per ton of product. One company manufactures a great variety of products, running through the gradations of profit per ton from the slab or billet as the marketed product, to the planished sheet, drawn tube or fine wire. One owns ore, railroads, vessels, coal mines; another may own ore, but pays land and water freights and buys a part of its coke in the market; a third is dependent in part on the ore market, buys much of its coke and is a considerable buyer of pig iron. One might take an export order and make a profit, while another at the same price would lose dollars on every ton. And even to the so-called integrated concern, supposedly controlling every element of supply, there are fluctuations in wages, in certain of its royalties, in transportation, in efficiency of labor and of railroad service. While there could be no absolute "normal" cost for even such a company, it can be understood that each subsidiary would be entitled to a profit on its separate product, and that only the occasional exigencies of international competition would be regarded as a justification for falling back upon a "fighting cost" derived by the elimination of inter-company profits.

A factor that has never been constant enough to allow of taking its measure is provision for the growth of the industry, for the supercession of plant or processes by better. The demand for money to add to or replace old capacity is almost as insatiate in the steel industry as in that of transportation. The difference has been that the steel companies often do not capitalize these additions, while railroad capitalization mounts higher and higher with each improvement. It may be claimed that these additions of furnaces and mills by the large steel companies really represent undistributed surplus and are not to be regarded at all as a charge against manufacture. It is only necessary to observe what happens to a company which fails to make these lavish provisions for new construction and for minerals, to decide whether they inevitably accompany a successful prosecution of the business as the lines are now drawn in this country.

It is conceivable that a time may come when heavy outlays as a protection for the future may not figure so prominently. As ore and coal lands are more thoroughly taken up there will be less to scramble for, and the steel industry may then reap the reward of the rigor of its present policy. Then, perhaps, the conditions will remain stable long enough to permit some approximation to "normal" cost.

The Increasing Demand for Heavy Melting Steel Scrap.

The long expected scarcity of scrap as raw material for the basic open hearth steel furnace is just coming to be realized. A much larger increase in scrap consuming capacity is in prospect than has been seen in any equal period in the past, yet a scarcity has already been noticed, due in part to recent increases in consumption and in part to provision being made against the prospective increase in consumption. Heavy melting steel has advanced to the unusual position of commanding a higher

price in the Pittsburgh market than basic pig iron, while the Chicago market for melting steel has risen beyond its usual relation to the Pittsburgh price, which has frequently permitted shipments from Chicago to the western limits of the Pittsburgh District. A great deal of old material can be used either in the open hearth steel furnace or in the iron mill, and so large a proportion of this has of late been diverted to the steel furnace that rolling mill scrap has made an undue advance as compared with selling prices of bar iron, forcing manufacturers to quote an advance in this product in market circumstances which would not usually dictate an advance.

The present scarcity of steel melting scrap may be interpreted as reflecting consumption which is to occur rather than consumption which has lately occurred, if reports are trustworthy as to the accumulations that have been made against the starting of the Gary plant.

Most of the present new erection of basic open hearth steel furnaces is accompanied by the creation of such blast furnace capacity as will leave a large gap between blast furnace and steel ingot capacity, which gap must be filled chiefly by the drawing of scrap from outside sources. In the early part of the expansion in the open hearth industry the gap was filled largely by the shipment of scrap from detached Bessemer steel plants to open hearth works under identical ownership. As long ago as May 22, 1902, we called attention to this modification in practice, whereby some Bessemer steel departments were deprived of scrap from their works which they had previously used to cool their heats, and the closer silicon limits to which their blast furnaces had to run in consequence.

As a rule, the present open hearth furnaces are expected to do 4000 tons of ingots a month. Thus 56 furnaces are being erected at Gary, and the official estimate for the plant is 225,000 tons of ingots a month. Allowing three weeks' idleness in the year, the annual output per furnace would be 45,000 tons, but as a rule six or seven open hearth furnaces are being allotted to one 150,000-ton blast furnace, so that barely 50 per cent. of pig iron is involved in the open hearth charge. At Lorain, six open hearth furnaces are being built, against one blast furnace; at Youngstown, 12 open hearth furnaces, against two blast furnaces; at Duquesne, 18 open hearth furnaces are being built, with two blast furnaces somewhat larger than the others, and rated at 325,000 tons a year between them; but as the Bessemer plant at Duquesne has been abandoned, there is not really as large an excess of steel capacity as in the other instance; while finally at Gary there are 56 open hearth furnaces against eight blast furnaces. Omitting the case of Duquesne altogether, we have here a total of 74 open hearth furnaces, ratable at 45,000 tons per furnace, at 3,330,000 tons of ingots annually, against 11 blast furnaces, ratable at 150,000 tons per furnace, at 1,650,000 tons annually. This is practically 50 per cent. pig iron. It figures out slightly less, and there is in addition the loss of metalloids in the pig iron, and of iron in the slag, but against all these losses there is the gain through ore, so that it is safe to assert that approximately 50 per cent. pig iron is provided.

Through the absorption of the floating supply of new Bessemer steel scrap by previous open hearth erection there is little left to draw upon except the scrap to be made in these new plants, and scrap available in the open market. Scrap will rise to the extent of at least 25 per cent. of the 3,330,000 tons of ingot capacity just figured, there being some scrap made which does not get into the ingot at all. That would provide one-half, leaving some 800,000 to 850,000 tons to come from the outside.

The bulk of requirements being considered is of course at Gary. The eight Gary blast furnaces are rated at 1,200,000 tons annually; the 56 open hearth furnaces, at 225,000 tons monthly, may be taken at somewhat over 2,500,000 tons annually, leaving outside of scrap originating in the plant some 600,000 or 650,000 tons annually to be found from the outside.

It is not to be supposed, of course, that such scrap will be bought to any great extent in the market, as it can be taken out of the market without being bought in the market. Arrangements are sometimes made now in the sale of finished steel, for an exchange of the scrap arising in its use, a convenient arrangement for each party, as it makes each both a producer and a consumer.

The change in conditions will be felt by the detached open hearth steel works, which have been buying scrap freely in the open market at a material spread below pig iron. Such operations not producing pig iron would as a rule buy little pig, and even those producing pig iron have found the purchase of scrap economical even when all prices were so high that there was a handsome profit in the pig iron alone, because the use of scrap increased the steel making capacity. Such operations will have to make their cost computations and determine their scrap percentage on a new basis if, as seems probable, the relatively higher price of scrap will be maintained.

It may be argued that these influences will not be felt so much when the trade is running slack as when all capacities are being taxed, but this would hardly be the case. The new plants will be operated, if only to try them out. Besides this, there is the influence that the Bessemer process is decadent, relative to open hearth, a clear instance of this being the abandonment not so long ago of the Bessemer department at Duquesne to make way for the additional open hearth capacity. It will be interesting to observe this preference for open hearth operations working out in this year's statistics. Last year the open hearth ingot production fell just 1 per cent. short of the Bessemer ingot production. There is every reason to expect that this year it will show a preponderance.

The position of the United States Steel Corporation is undergoing a remarkable shift as regards new and old scrap. Earlier in its history it was bent chiefly upon converting its ore into finished material as rapidly as possible, but with its growth it is able to pay attention to the reworking of scrap, and that on quite a large scale. At times there has been some uncomfortable competition from rerolled and otherwise reworked material. The tendency of these developments is decidedly to clear up this situation.

British Steel Imports Increase in Hard Times.

The stress of depression has had a noteworthy effect upon the foreign trade of Great Britain in iron and steel. From 4,606,875 gross tons in the first 10 months of 1907, British exports of iron and steel fell to 3,567,876 tons in the same period this year, and values declined from £40,272,351 to £31,786,544, or nearly 22 per cent. Accompanying this important decrease in exports was an increase in imports, the total from January 1 to October 31, this year, being 927,888 gross tons valued at £6,356,742, against 767,147 tons valued at £5,854,276 to October 31, last year. The pig iron exports furnish nearly 60 per cent. of the falling off in tonnage, the pig iron totals being 1,716,776 tons and 1,109,195 tons, respectively. The depression in the United States cut down British pig iron

shipments to this country about 90 per cent., or from 415,667 tons to 46,604 tons. Germany was also less of a customer for British pig iron, the exports to that country falling from 364,189 tons to 250,474 tons. Steel rail exports were practically identical in the two periods, at 356,428 tons and 356,432 tons, respectively.

The increase in imports of iron and steel to Great Britain is due to the selling of low priced semifinished steel, presumably from Germany and the United States, though the statistics do not separate the imports of "steel ingots, blooms, &c.," according to countries. Such imports in the 10 months this year were 446,500 tons, against 251,448 tons to October 31 last year, or an increase of about 80 per cent. The one matter of surprise is that British steel manufacturers, at a time when employment for their works is so urgent a need, should permit so large an influx of foreign steel, unless their costs are much farther above a competitive basis than has been commonly supposed.

CORRESPONDENCE.

Vanadium and Its Estimation.

To the Editor: I have read with interest the article by George Auchy on Vanadium, which appears in *The Iron Age* of November 12. As my name is mentioned therein, I venture to address you upon the subject. When a contribution is prefaced by its writer with the remark that he has little information on the subject and that he does not feel competent to pass any judgment upon it, intelligent criticism is rendered almost impossible, owing to the difficulty of finding a logical plane for discussion; therefore I must content myself by merely making assertions on one or two of the points raised.

PROOFS ACCUMULATED DURING MANY YEARS.

That there has been a wealth of assertion in connection with vanadium steels is perfectly true; I myself have made many claims for the recognition of their unique attributes; that there is a poverty of proof for any assertions I have personally made, however, I emphatically deny, such proofs having been laboriously accumulated as the result of practical as well as of laboratory observation of the vanadium steels during many years.

The instance which I put forward to the Institute of Mining Engineers was a typical one of many scores observed. Putting matters on the lowest grounds, your contributor will allow that it would be a most dangerous thing for a metallurgist with any shred of reputation to make a sweeping assertion before a body of technical and scientific men were that assertion merely based upon one lonely "snap" instance. But the popularity of vanadium among many steel makers, its daily increasing use by them, and the records of many service trials in widely differing service, serve perhaps better than anything as proofs that the assertions made rest on good foundations.

It is interesting to note that the quoted original experiments of Professor Arnold, which were made many years ago, and which in consideration of the rate at which the science of siderurgy has moved during the last few years may now be regarded as of historical interest, have been amply corroborated by the work of many investigators in showing that for all practical purposes of construction the useful upper limit of the vanadium addition to suitably compounded and properly prepared steel lies, generally speaking, in the neighborhood of 0.25 per cent., though in isolated instances, notably in high speed tool steels, the limit may be increased to 0.35 per cent.

Though I am not in agreement with Dr. Guillet as to the advisability of such a minute addition of vanadium as 0.05 per cent. in all cases, I can readily see that it is not necessarily illogical to deduce the great value of any substance if its use be confined to small doses. Such an analogy, taken from the realms of medicine, has been frequently cited by me. Strychnine, in minute doses, is admittedly a most valuable therapeutic in certain circumstances, but it is unnecessary to dwell upon the physiological effect of large doses.

THE ACTION OF VANADIUM ON STEEL.

My own idea, as I have so often publicly put on record, is that the action of vanadium on steel may be roughly subdivided under three heads:

1. Its undoubted scavenging action (which point I deal with more fully later) and its consequent indirect toughening action.

2. Its possible direct toughening action through its solid solution in ferrite. (Incidentally, it is possible that it is the resistance of this vanadiferous ferrite to the passage of carbides through it that gives to the vanadium steels their extreme readiness to "temper.")

3. Its strengthening action on steel due to the formation of complex carbides, which carbides are comparatively immobile. From this would be inferred the increased static effect of vanadium when it has more pearlite forming elements to work through, which deduction experience has fully borne out.

To insure these processes being properly performed, it will thus be seen that the alloy used must contain enough free vanadium to carry out No. 1, while the vanadium necessary to take care successfully of No. 2 must be either free or combined with an element which also goes into solid solution in ferrite under normal conditions; the balance of the vanadium can exist in any combination pleased, though naturally it is safer to have it in a free state or merely alloyed. Thus it will be seen that the quality of vanadium alloy used is by no means a factor to be neglected when consistent results are desired.

The question of the "possibility" of oxygen in the bath merely calls for the passing remark that, unfortunately, the problems of steel metallurgy do not confine themselves to simple arithmetic, the questions of equilibrium and of reversible reactions in certain zones of temperament confronting the investigator at every turn.

THE SCAVENGING ACTION OF VANADIUM.

It is suggested that titanium would be a better deoxidizer than vanadium, as the former is a denitrogenizer in addition. But it is claimed for vanadium that it also removes nitrogen. It is true that to date our proofs of this are more or less negative, being made up of the following observations:

1. That so far well made vanadium steels have never been found to contain any nitrogen.

2. That vanadium is known as one of the elements which form stable nitrides.

3. That metallic vanadium unites avidly with nitrogen at a high heat.

It is a moot point whether nitrogen in steel exists as nitride of iron or simply in solution; even in the former case the compound is of very feeble stability. But such evidence is certainly far from unsatisfactory proof. Furthermore, vanadium has the great advantage over titanium that the products of its scavenging are very fusible and easily slagged away, while in the latter case they are very refractory. And last, when scavenging is complete, we have the all important fact that vanadium begins another stage of useful work, while titanium has reached its limits.

Under the most favorable conditions, when the addition has been made with most refined care, 0.05 per cent. of vanadium (reckoned on the steel) has been required for scavenging; under carefully watched open hearth conditions, 0.07 to 0.08 per cent. would be a nearer estimate; while 0.01 per cent. is a common requirement even in open hearth steels which have been well deoxidized by the ordinary means. From these figures it would appear that something more than oxygen is purged away.

SHOCK TESTS.

Your contributor lays great stress upon the value of a series of shock tests. Much work to my own knowledge has been done in this direction. In fact, with Capt. H. Riall Sankey, I contributed to a portion of it in my observations on certain correlations of microstructure and impact resistance. It is perhaps unfortunate that much work, done in works' laboratories, is not published,

but the fact is easily understandable while our present code of works ethics prevails. No regular concurrence of the ability of metal to resist (1) shock, and (2) repetition of stress or fatigue has been observed, however.

It will universally be admitted that the great majority of service failures are of the progressive or detail fracture type, and are produced through molecular disintegration rather than through any want of static strength, ductility, or even shock resisting power in the original metal. It is allowed (1) that all metals deteriorate more or less under the action of repeated strains and stresses even though such strains and stresses be comparatively small, (2) that the rate of deterioration advances rapidly as the strains or stresses individually approach the elastic limit of the metal stressed, and (3) that the rate of fundamental deterioration is different in different steels.

As No. 3 represents our true factor of safety consideration, I respectfully submit that No. 2 should be eliminated in testing by always making a fatigue test just above the elastic limit—*i. e.*, making use of the alternating impact test rather than of the rotary test usually practiced—in which latter form of test the true fact to be ascertained is almost invariably obscured, hopelessly due to nonsimilarity of No. 2 conditions in comparative tests.

In resisting fatigue I assert that the proof of thousands of laboratory tests, backed up by countless service demonstrations, have proved beyond all doubt the preeminence of the vanadium steels as fatigue resisters.

DISCORDANCE ACCOUNTED FOR.

It is alleged that much of the published work concerning the effect of vanadium on steel is contradictory. Such discordance may be accounted for at least partially by the following facts:

1. The vanadium must and will do its scavenging first; if therefore the metal to be scavenged is very "dirty," as this scavenging is done at the expense of vanadium due to its simultaneous removal to slag, the addition of an equal amount of vanadium to two steels does not necessarily imply that these steels, unless they be equally well made, contain the same amount of vanadium. But some vanadium is required to remain dissolved in or admixed with the different components of the steel in order to exert its maximum effect.

2. That two different alloys prepared in different ways may possibly act differently owing to their different constitutional compositions, as previously explained.

3. That at the calescence and recalescence points great rearrangements of static and dynamic qualifications are observed, especially in vanadium steels. Thus, as many of the recorded results are set down without any reference whatever to the heat at which the bar has been finished, or the temperature at which it has been annealed, if annealed tests are recorded, the results are necessarily contradictory, as most recorded tests are purely of a static nature.

4. The matter of personal equation must not be entirely neglected, both on the part of the steel manufacturer and of the steel fabricator, and possibly to a small extent even of the test manipulator.

Your contributor bemoans the fact that thousands of dollars are annually spent on the determination of sulphur and phosphorous in steel without any attempt having been made, as far as he knows, to fix once and for all the undesirable maximum in each case. Such a statement is scarcely complimentary to the circulation attained by the copious investigations of Stead, Arnold, Ridsdale, Harbord, and many others in this direction. I might be permitted to point out that the fixation of any particular figure for all circumstances is, in my opinion, absolutely impossible, for the respective percentages of the elements must naturally be taken with regard not only to the attributes of the particular quality of the steel desired but also with what, in my opinion, has an all-important bearing on the subject, and that is their mutual coexistence with certain other elements. For instance, the amount of sulphur required to make steel red short must be enormously influenced by the quantity present, or absent, of manganese, oxygen and copper, while the permissible amount of sulphur is affected largely by the silicon content, arsenic content and carbon content of the steel.

With regard to the determination of vanadium in the laboratory, I cannot see the necessity of many of the laboratory methods that have been proposed by some writers. For myself, I have made use of the very obvious method which is to be founded upon the selective oxidizing action of permanganate and bichromate on solutions of chromium and vanadium salts which have been reduced by such a reagent as ferrous sulphate, which reagent is constant and certain in its action. This method is in very general use in the laboratories of the United States and of Europe to-day; in a few quarters complaints have been made that the "end point" of the one reaction is not sufficiently marked, but its exact recognition merely depends upon a small amount of observation in practice, such practice being easily attained by means of solutions of vanadium free steels to which synthetic amounts of vanadium solutions have been added.

There can be no possible question but that the commercial application of the element vanadium has marked a new epoch in steel manufacture.

J. KENT SMITH,
Chief Metallurgist, American Vanadium Company.
PITTSBURGH, November 18, 1908.

To the Editor: A criticism I beg to make of Mr. Smith's notice of my remarks on vanadium is that his communication leaves the subject just about where it was before. Instead of shooting at the mark I set up, he keeps resolutely banging away at the same old target, and pays no attention whatever to my target. In other words, he entirely disregards my plaintive appeal for more and stronger practical proofs, and goes on repeating the arguments and assertions that he and others have already made in the *Iron Trade Review* and elsewhere, and which we are by this time pretty familiar with. I have nothing against vanadium. On the contrary, when I see Mr. Smith so sure and so confident that vanadium is the best thing for steel that ever was, I am disposed to feel profoundly impressed, and think there must surely be something in it. But I must still ask, as I asked in my first remarks, Why do the vanadiumites display such an insuperable aversion to producing proofs? To be sure, Mr. Smith darkly intimates that he has lots of them on hand besides the one he quotes in the American Institute of Mining Engineers, if only he wanted to give them. Why this modest diffidence in quoting tests? It is unlike Mr. Smith's treatment of the subject in other respects. In conclusion, I must strongly insist that I am not taking the stand that Mr. Smith is wrong in his estimate of vanadium. As I explained in my article, I have no opportunity to investigate this matter for myself and am therefore not competent to form an opinion one way or the other. I am simply asking others to throw a little stronger illumination on the subject than they have so far done. Mr. Smith says it is hard to argue with a self-confessed ignoramus, and then he proceeds to argue, the same argument we have heard before. We are not hungering for argument. We have had enough. We want facts. And we will not be thrown into confusion if we get them. For we are not taking any stand or making any fight against vanadium whatever. GEORGE AUCHY.

PHILADELPHIA, November 24, 1908.

The Clinton Ores of New York State.

To the Editor: The review of the report on "Iron Ores of the Clinton Formation in New York State," published in *The Iron Age* for November 12, has just been called to my attention. As one of the writers of the report, on whom the responsibility rests for the accuracy of its information, I ask the privilege of entering a protest to the unfair and evidently prejudiced treatment which it has received. The fact that the review appears in your columns without signature, thus stamping it as an expression of editorial opinion, ought to assure some consideration, at least for a reply to the criticisms.

To state the matter at issue briefly, the review attacks the conclusions of the report on two main points: the availability of the Clinton ores for furnace uses and the estimates of the writers in regard to the tonnage repre-

sented in the deposits. In the matter of the availability of the ores, the reviewer has this to say:

> The thinness of the seams, the relatively high expense of mining and the low grade of the ore clearly preclude an extensive use of the Clinton hematites under present conditions of the iron trade or conditions likely to exist in this generation or the next. The fact that furnace after furnace located on the Clinton formation passed out of existence in the last century, while centers of iron making have been built up elsewhere and have grown steadily greater, tells the story.

Is it safe to draw upon the past of a rapidly changing industry like that of iron for data with which to forecast the future? It is scarcely a decade since similar opinions were current regarding the iron mines of the Adirondacks. The entire industry which had existed there for a century was suspended, mining plants and furnaces were dismantled, railroads torn up and the mining communities practically deserted—a result of the opening of the rich deposits in the Mesaba District. Yet there are now two furnaces in the region supplied by the local mines and more ore is being produced than ever before, with an assured activity for a long time to come.

COMPARISON WITH OTHER ORES.

The Clinton ores cannot certainly be mined as cheaply in New York as in Alabama, but there is no competition existing or likely to exist between the two districts. The local ores are finding and will find their application in New York and Pennsylvania, where the prices are practically fixed by the quotations for Lake Superior hematites. At a mining cost of from $1.25 to $1.75 a ton, which is a fair average in New York, the ores are a relatively cheap material for furnaces within easy shipping distance as a brief comparison will show. In 1907 the base prices for Lake Superior non-Bessemer ores with 51.5 per cent. iron were $4 to $4.20 a ton delivered at lower lake ports. This is about 8 cents a unit for ores containing in most cases an excess of silica as well as a considerable percentage of alumina. The Clinton hematites, with an average of say 35 to 40 per cent. iron and 10 to 15 per cent. of fluxing ingredients, can be mined and placed on the cars for from 4 to 5 cents per unit of iron. Surely the advantage, if anywhere, is on the side of the Clinton ores. The difference between an ore of 51.5 per cent. iron and no flux and an ore of 40 per cent. iron with 10 per cent. flux, for furnace uses, is not of paramount importance considering the contrast in regard to costs.

That the writers of the report are not alone in sharing the hopeful view of the situation with regard to these ores is amply witnessed by the recent developments which have taken place along the Clinton belt. Within the last year or so over 2000 acres of ore lands in this region have been acquired by option or purchase by individuals and companies for the purpose of active mining. Moreover, systematic operations have been carried on continuously by the Furnaceville Iron Company for the last 25 years, and it is hardly credible that a company of its reputation for able management is mining at a loss, seeing that it has very recently added to its properties. These facts assuredly do justify some promise for the future importance of the district.

DEPOSITS OF RICH LAKE SUPERIOR ORE DEPLETED.

Notwithstanding the inexhaustible resources of the Lake Superior ranges, of which the writer is well aware, it will be generally admitted, I believe, that the very rich ores, which were the cause of the closing down of the mines in New York, New Jersey and other Eastern States in the last decade, have been rapidly depleted, and that the average grade of the shipments from those ranges is more likely to show a further falling off, though perhaps not to the same extent as in the past few years, than to remain at the present standard.

As to the estimate of 600,000,000 tons, to which the reviewer takes exception, it seems only fair that you should give the writers of the report who made a thorough investigation of every part of the district, some credit for knowledge in the matter. This estimate is not based, as the reviewer intimates, upon the results obtained from eight holes 10 miles apart, which, in fact, were put down simply to test the intervals between the outcrops and the continuity of the ore on the dip, but upon a large amount of data, including field observations in tracing the outcrop of the ore beds, records of previous drill holes and test pits and drilling of the companies operative at the time. That this estimate is exaggerated or is "bound to excite expectations that will be disappointed," your reviewer perhaps may be qualified to pronounce, but if so, he should have indicated a few of the data upon which his judgment is based rather than indulge in seemingly gratuitous criticism. The opinions of competent mining men who have examined the district with care have been in conformity with this estimate and until evidence of its error is forthcoming, of which I can find none in the review, there is no apparent reason for qualifying or changing it.

If the writers of the report have committed errors of fact or of judgment they will cheerfully acknowledge them, but until further information is given by your reviewer they can hardly be expected to accept his bald statements as final.

D. H. NEWLAND,
Assistant State Geologist.

ALBANY, N. Y., November 17, 1908.

[The data on which to base the estimate of 600,000,000 tons are still unsupplied. This estimate, too, is said to be "conservative," which implies that the method of computation adopted, of which nothing is given in the report, showed a total actually exceeding 600,000,000 tons. The official letters transmiting the report, moreover, say that it "conclusively indicates that in the region of central New York there exists a commercial asset in iron of great magnitude and vast importance to the public of this State," and, further, that "if this estimate is warranted New York might yet easily become the leading iron State in the Union." (A State with no metallurgical fuel of its own and with a long haul from coke districts to its Clinton ore field!) We search in vain for the foundation of these large claims. The point made in *The Iron Age* was that the Clinton ores in New York have long been known for what they are worth. With that knowledge, so much of the New York iron industry as was based on these ores dwindled to small proportions before the Mesaba range even became a factor. The very fact that these ores have been mined for three-quarters of a century, and for the past 25 years by the one company named, and from all openings have made so small a contribution to the total iron ore production of the country—an average of 75,000 tons a year, or fifteen-one-hundredths of 1 per cent. for several years past, in a period in which at times there has been well nigh an ore famine—is sufficient indication of their limitations. The ore found in the eight test holes put down in 120 miles was generally of lower grade, in fact, than that taken from the few well-known surface workings to which the really serviceable mining information of the report relates.

The comparison made above with Lake Superior ores on the basis of price per unit of metallic iron is quite misleading. Furnacemen know that a 40 per cent. ore may be dear at half the unit price of a 60 per cent. ore. The excess coke and flux required for the leaner ore and the higher cost of labor, power, furnace linings and fixed charges per ton of pig iron, make the comparison cited in the above communication only half the story. Moreover, Lake Superior non-Bessemer ores do not contain "in most cases an excess of silica." Most Mesaba ores are low in silica and the lower priced silicious ores of a few properties on other ranges are shipped to supply the deficiency.

The admitted mining cost of the Clinton ores of New York is high, and the report grants that this may go to $2 as lower depths are reached. It may even go higher, if the costs of surface mining are correctly given. This is too high a cost for any extensive present or early future use of an ore of which from 2 2-3 to 3 tons is required for a ton of pig iron, as against 1¾ to 2 tons of Lake Superior non-Bessemer ores. The high price of lake ores in the past few years is no criterion for the average of a term of years. There is no guaranty that lean years will not bring a substantial decline in ore values.

Admirable as is the work of the New York State Geologist's office on the geology of the Clinton formation, so far as it has been investigated, and on the structure and origin of these ores, it will hardly be claimed that a

$5000 State appropriation would go far toward determining with an approximation to accuracy the amount and character of ore in a stretch of 120 miles by any methods approved by the practice so long in vogue in the Lake Superior District.—EDITOR.]

Gayley's Invention of the Dry Blast.*

BY R. W. RAYMOND, NEW YORK.

The immense commercial value of the Gayley dry blast process has been established beyond controversy. The testimonial of practical blast furnace managers, on both sides of the Atlantic, agrees that it reduces the cost of pig iron about $1 per ton; but from the same testimony it appears that this direct economy does not by any means cover its commercial advantages; in fact, that under conditions frequently encountered in practice it presents other benefits, of even greater immediate financial importance. To this point I shall recur in a later part of the present paper.

The history of the reception given to this invention, especially on the other side of the Atlantic, has repeated an experience familiar to American engineers. First, the reports of our practice were rejected as theoretically impossible, according to generally accepted notions and formulas; then the figures were reluctantly accepted; and finally the attempt has been made to explain theoretically how they could have been obtained. As to the Gayley dry blast, we Americans have been for several years in the last stage of this discussion, and the rest of the professional world is rapidly coming to it.

Meanwhile, the remark has been repeatedly made that, whatever Mr. Gayley's process may turn out to be worth, it was not an invention on his part, but simply the energetic and persevering execution of a procedure already proposed by others. This question I wish to discuss first in the present paper—What did Mr. Gayley invent?

The Nature of the Invention.

Realizing that this is not the place for a detailed argument on an issue of patent law, I shall not undertake to quote and criticise the publications prior to Mr. Gayley's first patents. It may be admitted, without such critical analysis, that the possible advantages of removing moisture from the air forced into an iron blast furnace were recognized and talked about 100 years ago, and again 50 years ago; that methods and apparatus for cooling air (and incidentally precipitating moisture from it) were known before Mr. Gayley's invention; and that, in one case at least, a system of cooling the blast for a converter had been actually patented. All these prior prophecies and proposals might be shown in detail to be impracticable, defective or visionary; but it is not my present purpose to discuss them. The fact remains that after they had all died out to the last echo, and after the object they sought had been pronounced by high scientific authorities, with the general consent of technical experts, economically unattainable, Mr. Gayley went ahead and did the thing.

This alone might not be conclusive as to his claims, since mere energy and perseverance, however meritorious, do not constitute invention. But this is not all. The significant fact must be added that, after beginning, with all the light that previous investigation and invention could give him, his attempt to carry out the "well-known" operation, Mr. Gayley spent six years in costly experiments before he found out how to do it. This certainly raises a strong presumption that, during those six years, Mr. Gayley discovered something not previously known; and it is that discovery which I wish to define.

All previous plans or suggestions for removing moisture from the blast by reducing its temperature have two features in common:

1. Following the analogy furnished by the natural precipitation of dew, they assume that moisture can be effectively removed from the blast in proportion to the reduction of its temperature to successively lower dew points.

2. They assume that this operation would be metallurgically advantageous in proportion to the extent to which moisture was thus removed. Considering the objectionable effect of such moisture to be a direct function of its amount, they all infer that removing part of the moisture would to that extent remove part of the evil, and that the benefit thus realized would be positive, even if it were but partial.

The first of these assumptions is based upon an incomplete conception of the analogy of nature. Closer observation should have shown these theoretical inventors that the lowering of the temperature of the atmosphere below its dew point does not produce the deposition of dew, except in a quiet atmosphere, because wind prevents the fall of dew and drives it away as fog. Moreover, all the inventions for taking moisture out of air by cooling it deal with bodies of air practically at rest. Nobody before Mr. Gayley had attacked the problem of taking the moisture out of a hurricane in that way; and everybody who had talked, however vaguely, of doing something of the kind with the blast for a furnace had overlooked the circumstance that simply segregating the moisture, by such means, as a mist, and then letting the mist be blown into the furnace, would secure no metallurgical benefit whatever.

What Mr. Gayley Discovered.

By years of patient experiment Mr. Gayley discovered, and was the first to declare, that if the reduction of temperature were carried to or below the freezing point of water, the ice or snow thus formed could be precipitated as well as segregated; that (with proper proportions of apparatus) it could be practically caught and held, so as to permit a blast free from suspended mist or fog to go forward into the furnace. The amount of aqueous vapor still held in the air would depend, of course, upon its temperature. There would be less of it at 10 degrees below freezing point than at that point. But this small difference has little practical significance. The main point is, that unless the moisture be not only segregated by cooling, but actually solidified, its approximately complete deposition from a rapidly moving current cannot be effected. Practically, therefore, the effect of going below the freezing point is to make sure that that point has been effectively reached in all parts of the current.

With regard to the second assumption above stated, it follows from what has been said already that no reliable metallurgical advantage can be secured by cooling the blast to any temperature short of the freezing point. For under such circumstances, not only might moisture thus segregated be carried onward as mist, but the possible precipitation of a part of it as rain, en route, would introduce a new and serious evil—the evil of uncertainty. This point deserves special discussion.

Certainty a Necessary Element of an Art.

The significance of certainty as a necessary element of any real industrial art has been often overlooked. To such loose logic we owe much fascinating but misleading rhetorical celebration of the "lost arts" of the ancients. In spite of the eloquence with which these "lost arts" have been extolled by orators and amateurs, I have been brought by much patient study to the conviction that (as a general rule, at least) no real arts have been lost. For an art is a process which arrives with reasonable certainty, by the intelligent use of definite means, at a desired and foreseen result. This proposition may be made clearer by illustrations. For instance:

Certain ancient tribes are said to have heated iron ore and wood or charcoal together in rude hearths, with the aid of the wind blowing across a mountain top, or of a primitive bellows, supplying an artificial wind, producing thus a half fused conglomerate, out of which could be selected pieces of true steel—indeed, of tool steel or razor steel—of exceptionally high quality. But the assertion that these ancient experimenters had the art of making steel is not justified by any such stories, however authentic. To combine blindly the materials and forces furnished by nature, and then to overhaul the result, seeking for fortunately valuable products, is not to practice an art. Such vague experimenting may

* A paper read at the meeting of the American Institute of Mining Engineers, at Chattanooga, Tenn., October 2, 1908.

be the beginning, out of which, with greater knowledge and the growth of conscious skill, an art may come; but an art it is not. For an art demands the intelligent use of definite means for a definite end.

On the other hand, it is not easy to say at what point a primitive and empirical procedure attains the rank of an art; and it is not necessary for my present purpose to fix that point. The much more important proposition which I wish to emphasize is this—that every industrial process involves the two elements of ignorant dependence upon natural conditions and intelligent control of such conditions, and that the degree of perfection attained by a given art is the degree in which the former element has been superseded by the latter. In practice we try to make a specified product by a given process; yet often, in spite of all our scientific or traditional precautions, a part of our output fails to meet the specifications imposed upon us, and must be rejected; so that, in a general way, it is fair to say that the perfection of an art is measured in inverse ratio to the proportion of such "rejections."

Chemical Analysis Has Revolutionized Furnace Practice.

The progress of our metallurgical arts toward perfection in this respect has been largely due to the exact determination of the composition of our raw materials. We can all remember when American iron and steel works began to employ chemists of their own, and to determine by chemical analysis not only the character of their products, but also the nature of their ores and fluxes. The result has been a revolutionary transformation of our blast furnace practice. The old "founder," who diagnosed his slag and dosed his furnace accordingly, has disappeared. The superstitious reliance upon this or that brand of ore as a material for this or that brand of iron has gone with him. The chemist dictates the charges and tests the product.

Yet, with all this increase of analytical control, the blast furnace has continued to be, as a great authority once described it, at once the crudest and the most delicate of metallurgical apparatus, subject to inexplicable irregularities, and seemingly obeying whims of its own, beyond the provision or regulation of the most scientific manager.

One reason (and, in my judgment, the chief reason) is that, while we have analyzed ores, fuels and fluxes to the second or third place of decimals, we have practically ignored the composition of the blast which goes into the furnace, although this material constitutes more than half the total weight of the materials charged. This defect in our control of the furnace process has not escaped notice. The effect of varying moisture in the blast has been recognized for 100 years past, especially as between summer and winter, and furnace managers have adjusted burden and blast in a rude way to meet the conditions thus created. But I do not think that the significance of diurnal and even hourly variations of the moisture in the blast was ever fully recognized until Mr. Gayley called attention to it. At all events, he was the first to propose a practical remedy for the evils resulting from such frequent changes.

The nature of these evils deserves here a preliminary word, especially because it affects profoundly the validity of all our theoretical calculations of heat economy, &c.

The Influence of Moisture in the Blast.

The influence of moisture in the blast may be summarized, with sufficient accuracy for my present purpose, as consisting of two elements: (1) The effect of a useless constituent, diluting the effective oxygen of the air and absorbing heat in acquiring the temperature of other materials, and (2) the effect of a constituent which, by its dissociation, absorbs heat in the hearth (where heat is most needed), and either, by the recombination of its elements, restores that heat in another part of the furnace (where it is neither needed nor desired), or else, through incomplete recombination (evidenced by the presence of free hydrogen in the furnace gas), fails to restore a part of the heat it has absorbed.

We are accustomed to determine the economy of the blast furnace process by means of thermo-chemical equations and heat balances, in which we take account of the composition, temperature, specific heat, heat of combination or separation, &c., of the materials entering the furnace, and the composition and temperature of the materials escaping from it. With due allowance for the incidental loss of heat by conduction and radiation, this method should be accurate, if the data upon which it rests are accurately determined. That it fails to give us a perfect criterion of our practice is due, in my judgment, to the circumstances that it is necessarily based on averages, and assumes these averages to represent uniform conditions; such and such a quantity, pressure and temperature of blast, composition of ore and flux, and quantity and grade of pig iron produced. These data are usually averaged from considerable periods; in fact, the longer the period taken, the stronger the assumption of the trustworthy character of the calculation—an excellent rule for most purposes, since averages eliminate incidental variations. But when incidental variations are directly influential upon technical and commercial economy, it is not to be hastily assumed that they can counteract one another, so that the average result is equivalent to that of uniform conditions. Suppose, for instance, that a certain temporary change in one factor of the process would have an injurious technical or economical effect, and that a subsequent equal change in the contrary direction would likewise have an injurious effect. Evidently the net result would not be fairly represented by calculations based upon the average conditions of the period embracing both changes, and upon the assumption that they canceled and neutralized each other.

The "Heat Balance" of the Blast Furnace.

That this supposed case is not imaginary I shall try to show. But first I would point out another defect in our usual method of stating the "heat balance" of the blast furnace. Our estimates of the utilization and the waste of heat may be practically fair enough, so far as the heat requirements of reduction and fusion, and the loss of heat in slag and gases are concerned; but they are seldom based on accurate data as to the grade of the pig iron actually produced. At least, so far as I now recall, the highest degree of accuracy in that respect does not go beyond a recognition of the general distinction between different grades, from foundry to white iron, or of the special heat requirements of pig iron of peculiar chemical composition (as to silicon, sulphur, manganese, &c.).

The statement that a given furnace is "running on" this or that grade of iron, and the use in calculation of the figures appropriate to that grade, seems to be the best that has been achieved in this regard. But a furnace "running on" a particular kind or grade of iron not only may, but in present practice invariably does, produce more or less iron of other grades (sometimes colloquially called "off iron"), the amount of which, sometimes even exceeding 50 per cent. of the total product, may seriously affect the value of our technical calculations of heat economy, if these do not include it as a factor. I offer this suggestion as a partial explanation of the fact that such theoretical calculations do not always furnish a safe criterion of alleged or possible technical economies. The method is scientifically sound, but it is applied to data too roughly determined for such precise mathematical discussion. Many of us have heard of the distinguished engineer, of whom it was said that in "duty trials" of engines he "would carry out to the third decimal place the determination of the weight of the ashes, while he guessed at the amount of coal shoveled into the fireplace." Possibly some such inconsistency may explain the hasty conclusions of some foreign experts that the reported technical economy of Mr. Gayley's process was "simply impossible."

The Commercial Economy o the Process.

As regards commercial economy, on the other hand, there is no room for doubt or contradiction. If a blast furnace is "running on" (*i.e.*, managed with the purpose of producing) a particular kind of pig iron, and if Mr. Gayley's process will deliver it altogether, or to an unprecedented degree, from the risk of producing incidentally another kind, not called for, and probably not de-

sired or not readily salable at a profit, the commercial value of this insurance is beyond measurement by any technical formula that has been, or could be, constructed. The case presented in Mr. Cook's paper on "Experience with the Gayley Dry Blast at the Warwick Furnaces,"* furnishes a striking illustration of this proposition.

As already observed, the testimony from iron works both in the United States and abroad agrees in declaring that the Gayley process reduces the cost of pig iron about $1 per ton; but this saving, though important, is trivial, compared with the commercial advantage of a more effective control of the operation and product of the furnace. To state the case roughly, the Warwick Iron & Steel Company was caught, with innumerable others, in the financial revulsion of 1907, which stopped for a time the market for pig iron. The company had a profitable contract with solvent customers for iron of a special grade; but the old and almost dilapidated furnace which it had kept in blast for the purposes of that contract was running so irregularly that only half—or less—of its product could be delivered under the contract, and the rest would have to be stored as not immediately salable, and, indeed, as never likely to be salable at a price covering the special expenses incurred for the purpose of producing the special, and more costly, grade of product for which the furnace had been burdened and operated.

Under these circumstances, the interest on the capital represented by the "off iron" would have exceeded the profits on the proportion of special iron delivered under the specifications of the contract; and a prudent manager would have been obliged to accept the unwelcome alternative (adopted, in fact, by most of our American merchant furnaces) of sacrificing his pending contract, blowing out his furnace, and submitting to the loss in general expenses, interest, &c., and the even greater damage caused by the scattering of skilled and trusted workmen and the inability to take immediate advantage of a general revival of business, or of a sudden special opportunity for a local resumption of work. These disastrous effects of a suspension of operations are, as I need scarcely say, those most dreaded by technical managers, since, besides their direct financial results, they involve the immeasurable anxiety and responsibility of efficient reorganization.

Fortunately for the Warwick Company it had just completed the installation of an expensive plant for the Gayley process; and the operation of this plant, under all the disadvantages of new and untried apparatus, inexperience of both manager and workmen, and dilapidated condition of the furnace then in blast, enabled the company to raise the proportion of its immediately and profitably marketable product from below 50 to above 80 per cent.; to fill its pending contract; and to realize, instead of industrial demoralization and financial loss, a substantial profit from continued operations. Indeed, it is no secret that, through the total gains of this campaign, the entire cost of the installaion of the Gayley system, including the sum paid for the patent right, was repaid in a few months, though the certified saving of $1 per ton in the average cost of pig iron would not by any means have accomplished that result in so short a time.

The situation above described is one which any manager of a "merchant" blast furnace (*i.e.*, a furnace selling its product to outside customers) may at any time encounter. But it carries a meaning also for establishments like the works connected with the United States Steel Corporation and other great concerns, which have a use for the "off iron" produced by their blast furnaces. For such "off iron" could be manufactured at smaller expense than when it is turned out as an unwelcome by-product from a furnace charged and operated, at extra cost, to yield a more valuable product. In short, every blast furnace manager knows that both technical and commercial economy, as well as relief from personal anxiety, would be secured if he could only be sure of making what he is trying to make.

Adds a Final Element of Certainty to Blast Furnace Control.

This brings us back to the inquiry: What is the bearing of Mr. Gayley's invention upon this desirable element of certainty, through complete and intelligent control, in the operation of the blast furnace?

As I have already observed, we have sought to secure such certainty through minute analyses of all the raw materials, &c., except the air of the blast, which weighs more than all the rest put together. But when we come to consider this element, we perceive at once that it cannot be usefully analyzed like ore, flux or fuel. We cannot determine its composition and then store it until we wish to use it; and if we could analyze it as it enters our blowing engines our knowledge would come too late to permit any effective action on our part, based upon such information. If we would attain that certainty of control which constitutes the perfection of an art, we cannot treat the air of the blast as we do all the other elements of the charge, which we regard as variables to the character of which we adjust our practice. The air, most variable of all, cannot be thus dealt with. We must make it practically a constant. Mr. Gayley has shown us that the only way to do this is to freeze the moisture out of it. No attempts at vague amelioration by partial measures will meet the case. What we want is, first, to know just what we are putting into the furnace through the blast, and, second, how we can continue to do that particular thing practically without variation.

Mr. Gayley, after years of costly experiment, has shown us for the first time how to attain this object; and I am not surprised that leading ironmasters in this country and abroad have recognized his invention as the greatest advance in blast furnace practice since the introduction of the hot blast by Neilson. It is scarcely too much to say that this invention, completing our mastery of conditions previously uncontrollable, has elevated the manufacture of pig iron from the category of processes which are partly art and partly accident to that of the true arts, which may be practiced with approximate scientific certainty.

* *Bi-Monthly Bulletin*, No. 24, November, 1908, p. 917. Also *The Iron Age*, October 1, 1908, p. 906.

The Connecticut Valley Metal Trades Association.—This organization held its annual meeting and banquet at the Nayasset Club, Springfield, Mass., November 30, with a large attendance, including President F. K. Copeland and Commissioner Robert Wuest of the National Metal Trades Association. L. P. Breckenridge, director of the Engineering Experimental Station of the University of Illinois, gave an interesting talk on the need of industrial education. Frank H. Page of the Confectioners' Machinery & Mfg. Company, Springfield, was chosen president; C. P. Fay, J. Stevens Arms & Tool Company, Chicopee Falls, Mass., vice-president; F. C. Breakspear, A. G. Spalding & Bros. Company, Chicopee, Mass., secretary; together with an Executive Committee consisting of R. D. Reed, H. B. Smith Company, Westfield, Mass.; F. C. Feiker, Northampton Cutlery Company, Northampton, Mass., and F. E. Holman, Otis Elevator Company, Springfield, Mass., the last named gentleman taking the place made vacant by the resignation of M. W. Bushnell, Bushnell Press Company, Thompsonville, Conn.

The Lake Superior Corporation.—The Philadelphia banks which took title in July to certain collateral, consisting of securities of the Lake Superior Corporation, owner of the steel plant at Sault Ste. Marie, Ontario, sold them last week to "new and responsible interests." It has been reported that the purchasers include E. J. Berwind, John T. Terry and others identified with the Canadian Improvement Company, which originally gave the securities as collateral. The statement that H. C. Frick is interested in the deal is denied. The securities acquired consist of $4,320,000 stock (out of $40,000,000), $2,123,000 first mortgage 5s and $243,000 5 per cent. income bonds. It is believed the new interests will take control of the company. The floating debt is said to be smaller now than at any time, the bank indebtedness being $660,000, with liquid assets of subsidiary companies amounting to nearly $2,000,000, besides $1,000,000 first mortgage bonds of the Lake Superior Corporation owned by that company. In early 1906 the bank indebtedness was $2,200,000.

PERSONAL.

Grant W. Spear, who for many years has been vice-president of the Dearborn Drug & Chemical Works at Chicago, took charge November 1 of the general Eastern offices of the company, at 299 Broadway, New York City, as vice-president and Eastern manager, Mr. McVicker being no longer connected with the Dearborn Company.

E. C. Felton, president, and John W. Dougherty, general superintendent of the Pennsylvania Steel Company; Quincy Bent, the company's furnace superintendent at Lebanon, Pa., and Charles F. Rand, president of the Spanish-American Iron Company, sailed for Cuba last Saturday.

Andrew Carnegie celebrated his seventy-first birthday November 25.

Howard S. Hart has resigned as president of the Corbin Motor Vehicle Company, New Britain, Conn., and has severed his connection with the company. He is succeeded as president by President Charles Glover of the Corbin Screw Corporation and of the American Hardware Corporation.

E. F. Hauserman, assistant city purchasing agent of Cleveland, has resigned to become on December 15 assistant secretary and treasurer and general sales manager of the Union Metal Post Company, Canton, Ohio. This company has recently commenced the manufacture of ornamental lighting posts, and it is the intention to extend this branch of the business and probably add additional lines.

George A. Yule of Kenosha, Wis., has been elected a director and the general manager of the Racine-Sattley Company, Racine, and has assumed full charge of the business. The company is a very large manufacturer of wagons and carriages, and it is said will soon commence the manufacture of light automobiles. Mr. Yule will retain his interest in the Bain Wagon Company and the Badger Brass Company, both of Kenosha.

L. A. Carlisle, who has been connected with the Central Foundry Company, New York, for a number of years in the capacity of manager at plant at Bessemer, Ala., has resigned his position to take charge of the affairs of the Smith Foundry Company, at Bessemer, in which he is interested. C. W. Nixon has been appointed to succeed him.

Joseph A. MacLennan has resigned his position at the Philadelphia works of the Link-Belt Company to accept the presidency of the Wilmot Machinery Company, New Orleans. He had been associated with the Link-Belt companies for over 12 years. During part of this time he was chief engineer of Woodward, Wight & Co., New Orleans agents of the Link-Belt Company, and through them made many friends in the Southwest.

H. L. Brinker, chief chemist at the Ohio Works of the Carnegie Steel Company, Youngstown, Ohio, will deliver a series of 18 lectures before the Y. M. C. A. of that city, the first being "A Historical Sketch of the Iron and Steel Industry; Refractory Material."

J. B. Pauley, formerly connected with the purchasing department of the International Harvester Company, Chicago, has been detailed to take charge of the company's affairs abroad, especially with reference to its interests in France and Germany. He will have his headquarters at Lille, France. He will be succeeded in his former position by W. B. Edgar, who, prior to the merger of the harvester interests, was with Warder, Bushnell & Glessner Company, and since that time has occupied important positions with the present organization.

W. A. Gordon, formerly of the Pittsburgh Gage & Supply Company, has recently become associated with the Ohio Brass Company, Mansfield, Ohio, and will sell Ohio radiator valves to the trade in the central territory.

Robert G. Wells, general manager of the Tata Iron & Steel Company, Ltd., sailed for India December 2.

Henry Gardner of Henry R. Merton & Co., metal and iron merchants, London, sails for home this week, after a prolonged tour, which included visits to the Nacosari and Cananea districts in Mexico, the Bisbee camp, Salt Lake, Butte and the Boundary District.

OBITUARY.

ANTHONY FRANCIS KEATING, Pittsburgh, died November 27, aged 68 years. He was a native of Pittsburgh and his first employment was as assistant bookkeeper for John Dunlap, a tin and sheet iron manufacturer and dealer in tinners' supplies. A few years later Mr. Keating became bookkeeper for Zug & Co., and subsequently rose to the position of manager of the important rolling mills of that firm, which he held until his retirement from active business due to ill health about 14 years ago. He was not only prominent in Pittsburgh manufacturing circles, but also in local political affairs. He was a member of the Select Council of the city from the early 70s until 1891, when he retired. He framed the city appropriation bills for many years. He was the first councilman to move for the acceptance by the city of the Carnegie Library, and was one of the trustees of the library for a considerable time. He was also for many years a director and treasurer of the Morganza Reform School and served on the directorate of the Western Pennsylvania Exposition Society, being for years its manager. He leaves a widow and seven children. Thomas F. Keating, vice-president of the Hardware Club, New York, is a brother.

WILLIAM H. JACKSON, New York, died suddenly November 24, aged 79 years. He was president of the Jackson Architectural Iron Works and the head of the old firm of William H. Jackson & Co. of Union Square, which business was founded in 1827 by his father, Nathan H. Jackson. He was a member of the New York Chamber of Commerce, vice-president of the New York Savings Bank, president of the General Synod of the Reformed Church in America, a member of the Union League and Republican clubs, Sons of the Revolution, New England Society, Metropolitan Museum of Art, Natural History Museum, the General Society of Mechanics and Tradesmen of New York, and a trustee of the Presbyterian Hospital. He leaves a widow and four daughters.

The Westinghouse Receivership to Terminate.—Final action was taken November 30 for the termination of the receivership of the Westinghouse Electric & Mfg. Company, at the meeting of the stockholders in East Pittsburgh. Resolutions were passed amending the by-laws of the company, increasing the directorate to 16, to be classified into one, two, three and four year terms, and to provide for the election of a proxy committee. The directors elected were: One year, Richard Delafield, E. C. Converse, Anthony N. Brady and J. D. Callery; two years, A. C. Becker, George N. Verity, William McConway and Charles A. Moore; three years, Charles F. Brooker, James F. Kuhn, E. F. Atkins and E. M. Kerr; four years, George Westinghouse, Neil Rantoul, Joseph W. Marsh and Albert H. Wiggin. The proxy committee will consist of James N. Jarvie, Jacob H. Schiff, Charles F. Adams, Robert S. Smith and E. W. Roebling. Application has been made to the United States Court in Pittsburgh for the discharge of the receivers not later than December 15, and return of the property to the stockholders.

The Bickford Fire Brick Company, which recently purchased the Curwensville Fire Brick Company's plant, Curwensville, Pa., has had the plant remodeled and enlarged, and it is now being operated at capacity. The company manufactures the Crescent fire brick exclusively, a high grade hand made brick for furnace linings. The company has opened an office at 1122 Farmers' Bank Building, Pittsburgh, in charge of J. A. Bickford, treasurer and general manager, and S. M. Bickford, secretary and sales manager of the company.

No. 2 stack of the Youngstown Sheet & Tube Company, Youngstown, Ohio, was blown in November 23. The company is now operating two new blast furnaces with a daily capacity of about 800 tons, but when operating its Bessemer steel plant full time it will still be a buyer of a considerable quantity of Bessemer iron in the open market.

NEWS OF THE WORKS.

Iron and Steel.

James W. Arnold, South Charlestown, W. Va., is negotiating with the Commercial Club of Ennis, Texas, with the view of establishing a rolling mill in that place, to have a capacity of 20 tons of finished iron a day. While it has not been definitely decided to locate at Ennis, a plant will be built somewhere in the Southwest.

John W. Wortham and associates, Dallas, Texas, are negotiating with the Penitentiary Board for a lease of the iron plant at Rusk, Texas, with the intention of placing it in operation.

The Ward-Dickey Steel Company, Indiana Harbor, Ind., has increased its capital stock from $50,000 to $100,000.

A company capitalized at $250,000, said to be represented by R. Jenkins of Wales, will build a plant for the manufacture of tin plate at Welland, Ont. The plant will have a frontage on the Grand Trunk Railroad and the buildings will be of steel. About 250 men will be employed.

The furnace of the Sheffield Coal & Iron Company, at Sheffield, Ala., is being repaired and will probably be in blast within 30 days.

It is announced that the plant recently leased by the R. C Foster Company, known as the Weller Rolling Mill, at Gadsden, Ala., will be put in operation within a week or 10 days.

General Machinery.

The Fink-Anderson Engineering Company, South Bend, Ind., has been incorporated with $30,000 capital stock, to manufacture gas power plants, build special machinery and do all classes of die work, jig work and jobbing machine work. The company is the builder of the Mecklenburg engine and at present is running full force 13 hr. a day. W. C. Anderson is president; R. A. Fink, secretary; H. A. Fink, treasurer.

The new building being erected on Forest Park Boulevard by the Champion Shoe Machinery Company, St. Louis, Mo., will be 155 x 182 ft., of brick construction, and so arranged that a second story can be added at any time. When the new building is completed the company will have over three times its present floor space.

The Automatic Roller Bearing Company, Chicago, Ill., has contracted with the city of Goshen, Ind., for a site on which to build a large plant, capable of giving employment to 2500 men. The officers of the company are: Thomas R. Butchart, president; Thomas W. Reilly, secretary; Isaac A. George, treasurer. The Crescent Motor Car Company, Detroit, has also closed a deal with the city of Goshen whereby it will move into the plant vacated by the Cosmo Buttermilk Soap Company.

J. S. Smalley of Muscatine, Iowa, is preparing to build a garage and machine shop for the building and repair of automobile and marine gas engines.

The Racine Electrical Mfg. Company has been incorporated at Racine, Wis., with a capital stock of $25,000, by Chas. A. Kraynik, Chas. M. Dietrich and Albert E. Anderson.

The Curtin-Hebart-Anthony Company, Gloversville, N. Y., is making plans for a new manufacturing plant it will erect during the coming year for the manufacture of a special sewing machine for heavy leather sewing, emery wheel dressers and cutters, glove and leather cutting dies and presses. The plant will consist of machine shop, foundry, pattern shop and office building, with a total of 30,000 to 40,000 sq. ft. of floor space. A large part of the machinery for equipping the new plant will be of special design and built by the company. The plant will be equipped with a steam power plant and all modern equipment. Present machinery will be moved to the new building. Mr. Curtin states that the purchase of additional machinery and equipment will not be considered until after May 1 of next year.

The Herath & Hultman Mfg. & Equipment Company has been incorporated at Schenectady, N. Y., capitalized at $100,000, to manufacture machinery. The directors are Augustus Herath, Iver Hultman, Daniel Cary, Wm. Bushnell and N. A. Schwitz, all of Schenectady.

Foundries.

The Lynchburg Foundry Company, New York, is to spend about $50,000 in making improvements to its plant at Radford, Va. Plans have been completed and contract for the steel work has been awarded to the Virginia Bridge & Iron Company, Roanoke, Va., for an addition to the special foundry, to be 50 x 125 ft. This building will be equipped with an electric traveling crane and pits for the vertical casting of flanged pipe ranging from 30 to 60 in. in diameter and 2 to 20 ft. in length.

The Gibbes Machinery Company, Columbia, S. C., is rebuilding its foundry, which was recently destroyed by fire, and has purchased practically all the equipment it will require.

Contracts have been let by the Board of Trustees of the Jeffersonville Reformatory, Jeffersonville, Ind., for the rebuilding of the foundry, recently burned. The iron and structural work was awarded to the Brown-Ketcham Iron Works, Indianapolis, Ind., at $7600.

The Iron City Sanitary Mfg. Company, Zelienople, Pa., has completed foundations for an addition to its plant, 100 x 300 ft., which will be used as a foundry and core room. The building will be of concrete and steel construction and will cost about $55,000. Modern equipment will be installed, and when the addition is completed the foundry capacity of the plant will be increased about 50 per cent.

The new foundry of the Atkinson Foundry & Car Shops, St. Albans, W. Va., has been largely equipped with Northern equipment, including a No. 48 Newten cupola, blower, ladles and a Northern crane, all furnished by the Northern Engineering Works, Detroit, Mich. The Atkinson Company will make car wheels, cars, &c., in a modern plant.

John B. Lee and associates of Anniston, Ala., have incorporated the Lee Foundry Corporation, with a capital stock of $20,000, for the manufacture of gray iron castings. The company has purchased the plant of the Wilson Stove & Mfg. Company and will operate the foundry, producing about 25 tons per day.

Herman J. Eberman and James A. Bailey, formerly connected with the designing department of the Art Metal Construction Company, Jamestown, N. Y., have resigned and will erect a brass foundry on Institute and Harrison streets, Jamestown, and engage in the business under the name of Eberman-Bailey Brass Works Company. Construction of the new foundry building will start at once.

Contracts have been awarded to Rafferty & O'Hara for the construction of a brass foundry on East Water street, Syracuse, N. Y., for the M. L. Oberdorfer Brass Company. A pattern shop and office building are to be erected at a later date.

Power Plant Equipment.

The Yolande Coal & Coke Company, Yolande, Ala., has under consideration the construction of a power plant to supply light to North Birmingham and adjacent cities, but plans for this improvement have not yet been completed.

A private company, of which A. R. Scott is manager, is erecting a new electric light plant at McCook, Neb., which will be housed in a building of brick and steel construction and equipped with a steam turbine unit. The cost of this improvement is estimated at $35,000.

Consulting Engineer Charles A. Alexander is to have charge of preparing the layout of the power plant to be installed in the new four-story factory building to be erected for L. Adler Brothers Company, 92 St. Paul street, Rochester, N. Y. The boiler plant will be from 800 to 1000 hp. and will supply both heating and power. The building will be 200 x 272 ft. and devoted to the manufacture of clothing. All the larger machines will be direct motor driven, and the smaller machines will be grouped to motor driven line shaft. The generating plant will consist of two or three direct connected generating units with total capacity of about 200 hp. Max Adler will receive bids on machinery and building after December 15.

John C. Thompson, William N. Shaw and Charles J. Starbuck of New York, who recently purchased the plant of the Watertown Engine Company and reorganized the company under the name of the New York Engine Company, are now having plans prepared for a large addition to the machine shop and foundry at Watertown, N. Y. In connection with the manufacture of steam engines the company will engage in the manufacture of a gas engine of an improved type. Work on the patterns for the new engine is already under way, but some time will be devoted to tests, &c., before placing the new engine on the market.

Bridges and Buildings.

The Metropolitan Bridge Company, Syracuse, N. Y., with a capital stock of $30,000, has been incorporated by A. H. Mallery, A. M. Mallery and G. H. Welch, to engage in general steel erecting and fabricating work.

Fires.

The foundry of the Freyberg Iron Company, Brooklyn, N. Y., was burned November 20, the loss being about $5000.

The passenger car shop of the Rhodes-Curry Company, Amherst, N. S., was destroyed by fire November 25, the loss being about $100,000.

The car plant of the J. G. Brill Company, Philadelphia, Pa., was partly burned November 29. In addition to a section of the works a large amount of car material was destroyed, the entire loss being estimated at $150,000.

The pattern shop of the Mesta Machine Company, Pittsburgh, Pa., was burned November 23, the loss being about $25,000. The building was 60 x 125 ft.

Hardware.

Since the fire in the shovel plant of the Indiana Rolling Mill Company, New Castle, Ind., last summer, the company has decided to combine its rolling mill and shovel plant at one point. A new shovel factory is in course of erection on a site adjacent to the rolling mill, and it is expected the new plant will be in operation about January 1.

On January 1 the Blakesley-Tuttle Stove Company, manufacturer of Security stoves and ranges, and the Hoover Stove & Casting Company, both of Kansas City, Mo., will be merged into a new organization, known as the Security Stove & Mfg. Company, with a paid up capital of $60,000. The Hoover Stove & Casting Company has successfully operated a foundry in

Kansas City and is well known to the trade as headquarters for stove repairs. Contracts have been let for a line of patterns which will be ready for the spring trade. The officers of the new company will be A. M. Blakesley, formerly of the Rock Island Stove Company, president; John K. Hoover, vice-president; G. W. Blakesley, manager; Charles R. Hoover, secretary and treasurer.

The Elwood Lawn Mower Mfg. Company, Elwood, Ind., has increased its capital stock from $10,000 to $25,000.

The Home & Office Novelty Company, Princeton, Ind., has been organized with $25,000 capital stock to manufacture novelties, especially an improved cuspidor, so constructed that it cannot spill. It is the invention of C. L. Snyder, president of the company. C. K. King is secretary of the company.

The New Haven Machine Screw Company, New Haven, Conn., has taken the building formerly occupied by the Jenser Smelting Company, adjoining its original plant, and has installed additional machinery. This gives the company 75 per cent. more floor space and provides ample facilities to take care of its growing business. The plant has been run to its full capacity during the past 12 months.

The controlling interest in the Standard Whip Company, Westfield, Mass., has been acquired by James P. McCarthy, Timothy S. Conway and Charles J. Rooney, who have taken the stock held by Edward H. Pratt. Messrs. Conway and Rooney are experienced whip men, having been connected with the New England Whip Company, Westfield, for a number of years. The new owners will assume immediate charge of the plant.

The Spargo Wire Cloth Company has been incorporated at Rome, N. Y., with a capital of $50,000, to manufacture copper, brass, and bronze, wire cloth of all kinds, and will erect a factory for the purpose, 100 x 200 ft., of steel and concrete. The company will use in the manufacture of its products wire made by the James A. Spargo Wire Company, which has an extensive plant at Rome. One of the specialties of the new company will be wire mosquito netting, which will not rust, for the use of the Government on Panama Canal work, for the protection of employees from mosquitoes.

Miscellaneous.

The Commissioner of Public Works, Yonkers, N. Y., has had specifications prepared and will take bids on an industrial railroad and equipment to be installed at the water works pumping station.

The San Diego Woods Products Company, San Diego, Cal., has begun work on a new electric plant designed to develop 500 hp., from which current will be supplied for the operations of the South Park & East Side Railroad street cars. Additional improvements planned include the erection of buildings and the installation of machinery for the manufacture of by-products, such as wool alcohol and other liquids. This portion of the work will probably be taken up about the first of the year.

The Tirrill Mfg. Company has been incorporated at Schenectady, N. Y., with a capital stock of $100,000, to manufacture electrical switches and other specialties under the patents of Allan A. Tirrill, electrical engineer, and electrical machinery and apparatus. The new company acquired the patents by purchasing the assests of the Schenectady Mfg. Company, which formerly controlled them. A small factory building acquired with the latter company's assets will be disposed of, not being adequate to the new company's requirements, and manufacturing space will be leased and equipped either in the Adriance, Platt & Co. building on Dock street, or in the Roy Building on South Church street. Allan A. Tirrill is president; Frank McClellan, vice-president, and Everett E. Lucas, secretary-treasurer.

Charles R. Hanscom, president of the Eastern Shipbuilding Company, New London, Conn., announces that the plant at Groton, where the Minnesota and Dakota and other vessels were built, will be sold at auction and the yard dismantled. The property will be sold within the next few weeks.

The Susquehanna Smelting Company, Lockport, N. Y., manufacturer of ferroalloys, announce that it will have plans prepared for doubling the present capacity. Herbert C. Harrison is vice-president and general manager.

Bartz, Wygant & Brown, Hornell, N. Y., manufacturers of electrical specialties, are considering consolidating with the A. J. Deer Company of Buffalo, and will erect a large three-story addition to their factory.

The Flint Cement Company, Central Building, Rochester, N. Y., has been organized by Lyman J. Baskin and others for the purpose of erecting a cement plant at Gorham, N. Y., with a capacity of 2000 bbl. daily. Mr. Baskin states that the organization is now being perfected and that the construction of the plant, purchase of machinery, equipment, &c., will not be taken up until next April.

The New York Central Railroad, New York, has given an order to the T. S. Marvel Shipbuilding Company, Newburgh, N. Y., for two steel tugboats. The tugs will be 105 ft. in length. Contracts have also been awarded to the New York Shipbuilding Company for four steel car floats, and to Harry Cossey of Tottenville, N. Y., for six grain boats for delivery during the coming year.

The Mechanical Engineers.

If there was one thing more than another that impressed those who attended the opening of the twenty-ninth annual meeting of the American Society of Mechanical Engineers in New York Tuesday evening, it was the more than ever systematic handling of affairs. The attendance at these meetings grows steadily larger, having considerably more than doubled in the last five years. Were it not for the superior facilities afforded by the Engineering Societies' Building, overcrowding and confusion would be unavoidable. The registering of members was accomplished with greater dispatch than ever by the improved arrangement, and this was but one instance of the foresight of the committee in making adequate provision for entertaining a large number.

According to custom, the initial event was the president's address. M. L. Holman of St. Louis, having been one of the participants in the conference of State Governors and others in Washington last May to consider the conservation of our natural resources, appropriately selected as his subject, "The Conservation Idea as Applied to the American Society of Mechanical Engineers." After reciting briefly the circumstances connected with the calling of this conference, the papers presented and the resolutions adopted, he gave an exhaustive and statistical discussion of the various phases of the problem—safeguarding of health, including prevention of disease, sanitation, protection of water supply and attention to the purity of foods; care of the land; preservation of the forests; utilization of water resources for irrigation and power; reclamation of swamp lands, and elimination of waste in the consumption of fuels and minerals. In connection with the last mentioned item, President Holman declared:

> Of our mineral resources, iron stands at the head as the distinct feature in our past development along mechanical lines, notwithstanding that electricity is trying to relegate us to the copper age. An unlimited supply of metal is not needed. We require simply sufficient metal for a working capital and to keep the stock good by supplying for wear and tear. At the present time an immense amount of iron is lying in the wrecks and scrap iron piles all over the country because it does not pay to work it over. . . .
>
> The conservation of iron must be by reducing waste to a minimum. As the supply of iron decreases the price will increase and the scrap iron merchant will become an important factor. The mathematical limit appears to point to the control of the old iron market as the ultimate function of the Steel Trust of the future.

Concluding, the speaker pointed out the responsibilities of the engineer in the field of conservation and gave advice to the society in applying the conservation idea to its own conduct, incidentally paying tribute to Secretary Calvin W. Rice and his associates for the improved methods of handling the society's affairs. He also urged "that the American Society of Mechanical Engineers make an effort to conserve both the time and the funds of future members by issuing a note book which shall gradually become the standard mechanical note book."

The conferring of honorary membership on Prof. John A. Brashear, which followed the president's address, was no more gratifying to the recipient than to those bestowing the honor, who are familiar with the great work which the professor has done, not only in astronomical research, but what is more important, through the wonderful instruments he has designed, in opening up possibilities for extending astronomical knowledge. Professor Brashear was escorted to the rostrum and presented to the president by W. R. Warner of the Warner & Swasey Company, which has executed many of the professor's designs. Mr. Warner briefly recounted the distinctions which justified the award of honorary membership and President Holman announced the election and presented the certificate.

Professor Brashear responded with evident appreciation, and, as he had been requested, gave a lecture, illustrated with lantern slide views, on "Photography of the Stars." It is safe to say that the remarkable facts and figures of which the speaker has an inexhaustible fund were hardly more impressive to those who heard them for the first time than to those who had the privilege of hearing some of them in the similar lecture given by Professor Brashear at the meeting in Detroit last summer.

The Iron and Metal Trades

The markets have quieted down considerably. In the case of Pig Iron this is due to the fact that melters have bought, the majority of them in a conservative manner, as to quantity, for delivery over the first quarter, and partly into the second quarter. They began toward the middle of October, new sets of buyers following the rising market, and in many instances returning later for additional quantities. The furnace interests advanced prices until now buyers being fairly supplied await developments and sellers show a good deal of indifference. In the Pittsburgh District some merchants are reselling Bessemer and Basic Irons at concessions from the furnace prices.

In the finished trades the new orders, generally speaking, have been falling off and some hesitation is developing which is attributed by some authorities to the feeling among buyers that reductions in the duty on Steel may bring an enforced lowering in prices. However little there may be in such anticipations, the fact does exist that it is shaping the policy of consuming interests, and is being felt in the trade. It has had its effect in counteracting to some extent the more buoyant sentiment which was spreading immediately before the election and gained a good deal of strength after it.

The Steel Rail trade is still lagging. The aggregate of sales is moderate and no really large quantities have been placed. Among the orders received were about 6000 tons from the Central Railroad of New Jersey and 3000 tons from the Wheeling & Lake Erie. Car builders are getting additional work, but their orders do not call for a large tonnage.

It is estimated that during the week ending last Saturday there were placed contracts for Structural Material aggregating 57,000 tons, of which the American Bridge Company booked 28,000 tons. These include contracts specifically noted last week. The American Bridge Company has booked the order for 10,500 tons of material for another open hearth building at Gary, which is to be followed later on by two Bar mills. The Northern Pacific Railroad has called for bids on 8500 tons of bridge work. Cleveland shipbuilding interests are to build two additional freighters, for which the material, about 2700 tons, has been placed with Pittsburgh mills. The Carnegie Steel Company is to furnish the 8000 tons of Plates and Shapes for the battleship Utah, which is to be built at the yards of the New York Shipbuilding Company.

The Tin Plate mills are assured of a fair run of work for the winter, having closed with salmon packers and can makers for round lots for delivery mostly prior to April 1. The active capacity is being increased by the starting of additional mills.

In some sections of the country the trade in Old Material continues active, with dealers outbidding the consumers. It is claimed that in a considerable number of instances this was due to the covering of shorts.

Heavy imports, due to the resumption of the Mexican mines, light exports and a record domestic production have been the recent features of the Copper market. The mills in the Naugatuck Valley have been busy lately, but the Wire trade is not doing relatively as well. First hands are maintaining prices, but Electrolytic is available at 14¼c., net, 10 days.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 2, 1908.	Nov. 25, 1908.	Nov. 4, 1908.	Dec. 4, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$17.25**	$17.25	$16.75	$18.75
Foundry No. 2, Southern, Cincinnati	**16.25**	16.25	15.75	18.00
Foundry No. 2, Local, Chicago	**17.00**	17.00	16.50	19.00
Basic, delivered Eastern Pa.	**16.50**	16.50	16.00	17.50
Basic, Valley Furnace	**15.50**	15.50	13.90	17.50
Bessemer, Pittsburgh	**17.40**	17.40	15.65	19.90
Gray Forge, Pittsburgh	**15.15**	15.15	14.40	18.90
Lake Superior Charcoal, Chicago	19.50	19.50	19.50	25.00
BILLETS, &c., Per Gross Ton:				
Steel Billets, Pittsburgh	25.00	25.00	25.00	28.00
Forging Billets, Pittsburgh	27.00	27.00	27.00	30.00
Open Hearth Billets, Phila.	26.20	26.20	26.20	30.00
Wire Rods, Pittsburgh	33.00	33.00	33.00	34.00
Steel Rails, Heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	**15.50**	15.50	14.50	13.75
Steel Rails, Melting, Phila.	**16.25**	16.25	15.25	11.50
Iron Rails, Chicago	**19.50**	19.50	18.00	15.50
Iron Rails, Philadelphia	**20.50**	20.50	19.75	17.50
Car Wheels, Chicago	**16.00**	16.00	15.25	22.00
Car Wheels, Philadelphia	**16.00**	16.50	15.00	19.00
Heavy Steel Scrap, Pittsburgh	**16.50**	16.75	15.50	13.50
Heavy Steel Scrap, Chicago	**15.25**	15.00	15.00	12.00
Heavy Steel Scrap, Philadelphia	**16.25**	16.25	15.25	11.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	**1.50**	1.50	1.45	1.75
Common Iron Bars, Chicago	1.50	1.50	1.50	1.75
Common Iron Bars, Pittsburgh	**1.50**	1.50	1.40	1.60
Steel Bars, Tidewater, New York	1.56	1.56	1.56	1.76
Steel Bars, Pittsburgh	1.40	1.40	1.40	1.60
Tank Plates, Tidewater, New York	1.76	1.76	1.76	1.86
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.70
Beams, Tidewater, New York	1.76	1.76	1.76	1.86
Beams, Pittsburgh	1.60	1.60	1.60	1.70
Angles, Tidewater, New York	1.76	1.76	1.76	1.86
Angles, Pittsburgh	1.60	1.60	1.60	1.70
Skelp, Grooved Steel, Pittsburgh	1.45	1.45	1.45	1.70
Skelp, Sheared Steel, Pittsburgh	1.50	1.50	1.50	1.80
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, Black, No. 28, Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, Pittsburgh	1.95	1.95	1.95	2.05
Cut Nails, Pittsburgh	1.75	1.75	1.75	2.00
Barb Wire, Galv., Pittsburgh	2.40	2.40	2.40	2.50
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**14.50**	14.50	14.00	13.75
Electrolytic Copper, New York	**14.25**	14.12½	13.75	13.62½
Spelter, New York	**5.20**	5.10	4.90	4.60
Spelter, St. Louis	**5.05**	4.95	4.80	4.45
Lead, New York	4.35	4.37½	4.35	4.12½
Lead, St. Louis	*4.20*	4.22½	4.30	4.00
Tin, New York	*29.40*	30.35	30.37½	30.10
Antimony, Hallett, New York	**8.12½**	8.12½	8.00	8.75
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$3.89	$3.89	$3.89	$4.09

Chicago.

FISHER BUILDING, December 2, 1908.—(*By Telegraph.*)

While the tonnage record of November contracts has not been swelled by any Rail purchases of notable importance, orders for other railroad material for car and track repair work have steadily increased. The general demand from other Iron and Steel consuming industries has held up well, so that on the whole the totals for the month just ended will equal, if not slightly exceed, those of October. The Steel finishing mills are running fuller, and more Open Hearth furnaces are being started to supply them with Steel. Seven more Open Hearths in the South Works of the Illinois Steel Company were lighted Monday, making 19 out of the total of 24 now in operation. The five remaining furnaces are being put in readiness for service when needed. Five of the six Open Hearths in the Inland Steel Company's plant are going and the finishing departments are all fairly well engaged. Specifications for Steel Bars and Structural Material are coming out quite freely, but shipments of material for warehouse stocks are expected to slack up somewhat during the present month, on account of the taking of inventories at the close of the year. The aggregate of Spike and Bolt orders entered by the principal interest last week amounted to 39,000 kegs, besides which there is prospect of further orders of even greater volume. The gradual extension of new car construction is reflected in a more active demand for Axle Billets. The recent orders entered by the Illinois Steel Company were last week increased by the purchase of 1000 tons, taken by a local forge shop. Pig Iron has slowed up, and the moderate business now moving con-

cerns chiefly first quarter requirements, though some new orders are being booked through the first half. No section of the market displays more strength and firmness than Old Material. It is strongly supported by conditions, which at present are operating to equalize the supply and demand, and dealers are not disposed to disturb the balance by making offerings from their reserve stocks.

Pig Iron.—After a period of active buying which began in the latter part of October, and was maintained with considerable vigor until the close of November, the Pig Iron market has settled down to a state of comparative quiet and inactivity. Quite a number of contracts representing the deferred purchases of first quarter requirements were, however, included in last week's transactions, but most of them were for small lots. On all of this business recent advances are reported to have been steadily held, the price in the local market being $17.50, delivered, for Northern Iron, and $13, Birmingham, or $17.35, delivered, for Southern. On all second quarter business the Northern furnaces are asking $18, while at least two of the leading Southern producers are entering orders through the second half at $13, Birmingham. Several fair sized inquiries are out for first half which have not as yet been closed. A few of these comprise amounts ranging from 1000 to 3000 tons, and are regarded as likely to result in orders. Some interest of a tentative character, at least on the part of consumers, is beginning to develop in third or fourth quarter deliveries, regarding which a number of new inquiries have come into the market within the past few days. As far as can be learned, none of the furnaces, either Northern or Southern, is willing to contract so far ahead, and no quotations are being made for second half. Present indications point to a quiet market during December. In fact, a good many melters are requesting changes in the schedules that will put the deliveries of all Iron not required for immediate use over into January. This action is prompted by the desire to reduce stocks as low as possible in the inventory season. From the viewpoint of both producers and consumers, the situation affords encouragement, being marked by elements of strength, which promise well for the future. The following quotations are for December delivery, f.o.b. Chicago:

Lake Superior Charcoal	$19.50 to $20.00
Northern Coke Foundry, No. 1	17.50 to 18.00
Northern Coke Foundry, No. 2	17.00 to 17.50
Northern Coke Foundry, No. 3	16.50 to 17.00
Northern Scotch, No. 1	18.00 to 18.50
Southern Coke, No. 1	17.85 to 18.35
Southern Coke, No. 2	17.35 to 17.85
Southern Coke, No. 3	16.85 to 17.35
Southern Coke, No. 4	16.35 to 16.85
Southern Coke, No. 1 Soft	17.85 to 18.35
Southern Coke, No. 2 Soft	17.35 to 17.85
Southern Gray Forge	15.85 to 16.35
Southern Mottled	15.60 to 16.10
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	17.90 to 18.40
Jackson Co. and Kentucky Silvery, 6 %	19.90 to 20.40
Jackson Co. and Kentucky Silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky Silvery, 10 %	22.90 to 23.40

(*By Mail.*)

Billets and Rods.—Business in Forging Billets, though light, shows some improvement. Aside from an order of 1000 tons of Axle Billets taken by the leading interest, the demand is comprised of scattering orders for small lots. Practically all such orders for Forging Billets are reported to have been placed at the regular base price of $28.50, Chicago. Wire Rod specifications are coming out quite satisfactorily, and a considerable tonnage of new contracts are being placed, particularly with Eastern manufacturers. Prices hold firm and are unchanged, as follows: Bessemer, $33; Basic, $34; Chain, $33, all at Pittsburgh.

Rails and Track Supplies.—No contracts for any of the important standard Rail tonnage now pending are reported to have been closed this week, though it is expected that one of the lots representing the requirements of a Western line, amounting to about 40,000 tons, will be closed within a few days. A few small Rail orders have been placed, among which was one for 1200 tons of Open Hearth Rails, which will be rolled at the South Works of the Illinois Steel Company; an order of 1100 tons from the financial agent of the State of Texas will be supplied by the same interest. To the liberal volume of Spike and Bolt orders recently entered by the Illinois Steel Company there were added last week 25,000 kegs of Spikes and 10,000 kegs of Bolts from a leading Western line, and 4000 kegs of Spikes for the new Harriman line being built on the western coast of Mexico. Business in Light Rails is gradually increasing, a fact that indicates the continued expansion of activities in the larger industrial enterprises, particularly in the mines and saw mills. We are advised that full prices have been obtained on some recent orders, and except in extreme Southern territory, where keen competition is met, concessions exceeding $1 are infrequent. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car lots, 1.60c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.15c. to 2.25c., base, Square Nuts, and 2.30c. to 2.40c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., $26; 20-lb., $27; 16-lb., $28; 12-lb., $29. Standard Sections, Bessemer, $28; Open Hearth, $30, on lots of 500 tons and over; on smaller lots, $2 a ton extra.

Structural Material.—The question of the award of contract on bids recently submitted for the construction of the new Chicago City Hall has been referred by the city engineer to the City Council. Owing to the alleged irregularity in submission of bids, it is questionable if the contract will go to any one of the three lowest bidders, and it is not improbable that before final settlement of the matter is reached, litigation may ensue with the result of delaying the letting of the work. Last week brought little new business to fabricators, but few of the pending contracts having been closed. Among these were 1000 tons for the office building of the La Salle Investment Company, Broadway and Olive street, St. Louis, taken by the Richards-Noelke Iron Works, Indianapolis; 270 tons for the Wisconsin Steel Company's plant, secured by the Pittsburgh Steel Construction Company, and 1500 tons of additional material required for the channel spans of the McKinley Bridge at St. Louis, which is being fabricated by the Pennsylvania Steel Company. The American Bridge Company entered an order from the Santa Fe Railroad for 500 tons of bridge material; the same company has placed an order for 10,500 tons of plain material, which it will fabricate for the construction of another open hearth building at Gary. The Northern Pacific Railroad is taking figures on 8000 tons, besides which there are a number of similar inquiries in the market for lots ranging from 1000 to 3000 tons. The Missouri Valley Bridge Company secured the contract for the erection of a highway bridge at Missoula, Mont., requiring 1000 tons on a bid of $143,500. The Board of Sanitary Commissioners, Chicago, is taking figures on a bridge for the St. Paul crossing over the North Branch, which calls for 172 tons. Specifications for plain material are coming in at a good rate, and the structural mill at the South Works is now running practically full on a double turn. Prices from store are 1.95c. to 2c. Mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.78c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.78c.; larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 15 in., 1.88c.; Zees, 3 in. and over, 1.78c.; Tees, 3 in. and over, 1.83c.

Plates.—Though not concentrated in large lots, Plate orders are more numerous, and the rolling schedules of the mills are better filled than for some time. A good portion of the business coming out is derived from structural work in buildings, bridges and new car construction. Jobbers report a moderate demand from store, although nothing beyond actual present requirements is considered in the general run of orders. Mill prices are a little firmer, and departures from the regular schedule are growing less frequent, though they have not entirely disappeared. We quote mill shipments as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.78c.; 3-16 in., 1.88c.; Nos. 7 and 8 gauge, 1.93c.; No. 9, 2.03c.; Flange quality, in widths up to 100 in., 1.88c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.88c.; Flange quality, 1.98c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.25c.; 72 in. wide, 2.30c. to 2.40c.; No. 8, up to 60 in. wide, 2.10c. to 2.15c.; Flange and Head quality, 0.25c. extra.

Sheets.—Business in Sheets continues to hold fairly even. Jobbers are buying and specifying conservatively, not desiring to increase stocks more than is necessary prior to the taking of inventories. Heavier gauges are not so much in demand as the lighter Sheets, which in both Black and Galvanized are moving in fair volume. Mill prices have steadied up considerably of late, and it is stated that as a rule they are regularly maintained. There continues, however, to be some deviation from the regular schedule of store prices. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.25c.; No. 16, 2.35c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—Steel Bars have been conspicuously active since specifications against the July contracts begun to come in, and continue to maintain their leading position. Specifications amounting to 15,000 tons have been booked this month by the leading producer. The situation in Iron Bars is without material change as respects price or demand. Orders generally include only such amounts as are required for immediate use, though perhaps they are a little more numerous.

Quotations, Chicago, are as follows: Steel Bars, 1.58c., with half extras; Iron Bars, 1.50c.; Hoops, No. 13, and lighter, 1.98c., full extra, Hoop card; Bands, No. 12 gauge and heavier, 1.58c., half extra, Steel Bar card; Soft Steel Angles and Shapes, 1.68c., half extras. Store prices are as follows: Bar Iron, 2c. to 2.15c.; Steel Bars, 1.90c. to 2c.; Steel Bands, 1.90c., as per Bar card, half extras; Soft Steel Hoops, 2.25c. to 2.35c., full extras.

Merchant Pipe.—Jobbers' orders are being carefully limited in amount to meet only current requirements. The near approach of the inventory season makes it desirable to reduce stocks as low as possible, and this, it is held, accounts for some slowing up in demand. Under ordinary conditions, however, trade is usually light through the winter months, and no large movement is looked for in the immediate future. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 73.2; 7 to 12 in., 70.2; Galvanized, ¾ to 6 in., 63.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 73 per cent. on Black Steel Pipe, ¾ to 6 in. About three points above these prices is asked for Iron Pipe.

Boiler Tubes.—The necessity for increased motive power is bringing out a moderately increased demand for Locomotive Tubes for repair work, and some new orders of fair size are being placed. Merchant Tubes continue quiet, with no movement of special interest. Mill quotations for future delivery, on the base sizes, are as follows: 2¾ to 4¼ in., inclusive, Steel Tubes, 63.2; Iron, 50.2; Seamless, 50.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—An order for 150 tons of Shafting reported to have been placed at regular discounts indicates a better degree of firmness than has characterized Shafting prices for some time. There are few new orders for Merchant Steel coming in, but specifications are being furnished freely by manufacturers; jobbers, however, are holding back a little, not wishing to increase stocks before the first of the year or until after stock taking is over. We quote as follows: Planished or Smooth Finished Tire Steel, 1.78c.; Iron Finish, up to 1½ x ½ in., 1.73c., base, Steel card; Iron Finish, 1½ x ½ in. and larger, 1.58c., base, Tire card; Channels for solid Rubber Tires, ¾ to 1 in., 2.08c., and 1⅛ in. and larger, 1.98c.; Smooth Finished Machinery Steel, 2.08c.; Flat Sleigh Shoe, 1.63c.; Concave and Convex Sleigh Shoe, 1.83c.; Cutter Shoe, 2.05c.; Toe Calk Steel, 2.13c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Cold Rolled Shafting in car lots and over, 57 per cent. off; in less than car lots, 52 per cent. off, with carload freight allowed within base territory.

Metals.—While there is little future buying, stock orders are fairly plentiful. The railroads are purchasing more liberally for the replenishment of storehouse stocks, and the consumption of the smaller manufacturing concerns is gradually increasing. Copper prices hold steady in spite of repeated efforts on the part of speculative interests to advance them. Lead is easier and quiet, but Spelter is in better demand. Quotations are as follows: Casting Copper, 14¼c.; Lake, 14½c. to 14¾c., in car lots, for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 32½c.; small lots, 34½c.; Lead, Desilverized, 4.45c. to 4.55c., for 50-ton lots; Corroding, 4.70c. to 4.80c., for 50-ton lots, in car lots, 2¼c. per 100 lb. higher; Spelter, 5.10c. to 5.25c.; Cookson's Antimony, 10½c., and other grades, 9¾c. to 10¼c.; Sheet Zinc is $7, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13¼c.; Heavy Copper, 13c.; Copper Bottoms, 11¾c.; Copper Clips, 13c.; Red Brass, 12c.; Yellow Brass, 9½c.; Light Brass, 6¼c.; Lead Pipe, 4.35c.; Zinc, 3¾c.; Pewter, No. 1, 21c.; Tin Foil, 23c.; Block Tin Pipe, 26c.

Cast Iron Pipe.—A good many inquiries for Pipe on deliveries into next year are coming into the market. They seem to be inspired by the belief that the advancing tendency of Pig Iron may mean a raise in Pipe prices later on. Foundries, however, when quoting at all on forward business, are asking a material advance over present values. At the second letting of the 3500 tons of Pipe required by the city of Detroit, all bids were again rejected and the letting will be re-advertised. In the meantime, the city is taking bids on 10,000 tons of 42 in. and 48 in., principally the latter size, to be let December 1. This tonnage was mentioned in last week's report, in a phrase that was interpreted as crediting it to Chicago instead of Detroit. We quote nominally per ton, Chicago, as follows: Water Pipe, 4 in., $27; 6 to 12 in., $26; 16 in. and up, $25, with $1 extra for Gas Pipe.

Old Material.—There are two distinct sets of prices now effective on Scrap; the one governing the sale of material on track and small lots for current consumption, and the other applying to the transactions of dealers on railroad offerings and tonnage from stock piles. In deals of the former character, inside prices are not infrequently shaded, while on trading of the latter kind outside figures are generally realized and occasionally overreached. Good prices were secured by the Chicago, Burlington & Quincy on its list of 3000 tons, which was the only one offered last week. The No. 1 Wrought brought $15.15; Iron Rails, $19.40; Frogs, Switches and Guards, $15.25; Rail Ends, $16; Angle Bars, $17.25, and Borings, $9.60. No heavy purchases by consumers were reported, though the general run of orders from this source is equal in volume to that of Old Material coming out. Holders of the majority of Scrap in stock piles are not letting go of it at present prices. Under these conditions the market is naturally firm and any material increase of consumption would probably be reflected in higher prices. The lists out for closure this week include the Chicago & Northwestern, 3690 tons, in which there are 500 tons of Wrought, 300 tons of Iron Rails and 1000 tons of Rerolling Steel Rails, and 600 tons from the Illinois Central. The following prices are per gross ton, f.o.b. Chicago:

Old Iron Rails	$19.50 to $20.00
Old Steel Rails, rerolling	17.25 to 17.75
Old Steel Rails, less than 3 ft.	15.50 to 16.00
Relaying Rails, standard sections, subject to inspection	22.50 to 23.50
Old Car Wheels	16.00 to 16.50
Heavy Melting Steel Scrap	15.25 to 15.75
Frogs, Switches and Guards, cut apart	15.25 to 15.75
Mixed Steel	12.25 to 12.75

The following quotations are per net ton:

Iron Fish Plates	$17.50 to $18.00
Iron Car Axles	21.00 to 21.50
Steel Car Axles	18.50 to 19.00
No. 1 Railroad Wrought	15.00 to 15.50
No. 2 Railroad Wrought	14.00 to 14.50
Springs, Knuckles and Couplers	14.50 to 15.00
Locomotive Tires, smooth	14.75 to 15.25
No. 1 Dealers' Forge	11.75 to 12.25
Mixed Busheling	9.25 to 9.75
Iron Axle Turnings	9.00 to 9.50
Soft Steel Axle Turnings	9.00 to 9.50
Machine Shop Turnings	9.00 to 9.50
Cast Borings	8.00 to 8.50
Mixed Borings, &c.	8.00 to 8.50
No. 1 Mill	9.00 to 9.50
No. 2 Mill	8.00 to 8.50
No. 1 Boilers, cut to Sheets and Rings	10.50 to 11.00
No. 1 Cast Scrap	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.25 to 12.75
Railroad Malleable	14.00 to 14.50
Agricultural Malleable	11.75 to 12.25
Pipes and Flues	11.00 to 11.50

Theodore Geissmann & Co., Chicago, direct mill representatives for iron, steel and wire products, have been incorporated in Illinois, with a capital of $20,000.

St. Louis.

ST. LOUIS, MO., November 30, 1908.

The returns made by the financial institutions of St. Louis showing their condition indicate a gratifying increase in deposits over the previous six months. The deposits of 16 banks aggregated $51,308,811.20, in which summary the deposits of the trust companies are not included. This financial statement not only indicates fairly prosperous business conditions, but also shows that there is no lack of funds for legitimate enterprises. Bank clearings continue quite large, and are greater than those for the same period last year. The reports of the total tonnage handled, both inbound and outbound, by the two score or more railroads having terminals here, show a substantial improvement over the first and second quarters of the year, thereby offsetting a large portion of the loss sustained the first half of the year. The observance of Thanksgiving Day brought about a suspension of business, and as is apt to be the case with wholesale interests tended to postpone closing transactions which were pending.

Coke.—An increase in the inquiry for Coke indicates that a more active market may be looked for next month. A leading house reports inquiry for between 2000 and 3000 tons of 72-hr. Foundry, shipment over first half of 1909. The De Camp Bros. & Yule Iron, Coal and Coke Company reports closing contract with the St. Louis Blast Furnace Company for its requirements of Coke for the year 1909. In quoting prices the range for Standard 72-hr. Foundry may be given as $2.35 to $2.50, at oven, Connellsville, shipment over first half of 1909. We hear of some contracts for Standard Coke at $2.20 for prompt shipment, and as low as $2.35 for shipment over the first half of 1909. At the close of the week the market indicated a firmer feeling, and the recent advance is likely to be maintained. Virginia is held at $2.50, at oven. The inquiry is quite good.

Pig Iron.—With most of the principal sales agencies there has been a slacking up in inquiries from large consumers, but all of them report hearing from numerous small buyers. A leading Alabama producer's office states that inquiries are coming in well, sales continue fair, but being small lots do not aggregate a large tonnage. They will take orders only for first quarter of 1909, and not over 150 tons will be booked on each contract. For larger quantities the

offer must be submitted to the company for confirmation. One of the principal sales agencies states that some producers are not offering at all, not that they are sold up, but look for an advance in the near future. Another house states that in the aggregate during the week it has had inquiries for 3000 tons, mostly for forward shipment. With all the houses the inquiry is confined to Southern Iron. We quote the market as follows: No. 2 Foundry, prompt shipment, $13, Birmingham; for shipment over the first quarter of 1909, $13 to $13.50. Ohio Malleable Bessemer is unchanged at $16, Ironton. The market is very firm, and offerings are light. Northern Silvery, 8 per cent. Silicon, is selling at $18.50, Jackson, Ohio. The market for Basic is quiet and unchanged.

Finished Iron and Steel.—For Structural Material the demand is quiet, except for small lots from fabricators for local and country contracts. For Standard Rails the inquiry is better, and it is reported the leading sellers are about closing a deal with a local railroad for 2800 tons. The demand for Light Rails is increasing beyond expectations, and is coming from lumber interests principally, with some inquiry from mining companies. A large business is being done in Bolts, Spikes, Angle Bars, and all kinds of Track Material, with the prospect, it is reported, of an advance in prices. The demand referred to is coming from the railroads and railroad supply houses. While jobbers are having a fair trade, they are not buying freely of Bar Iron and Bar Steel and their products.

Old Material.—Interest in the market for Old Material is indicated by a fairly good number of inquiries from consumers, but the sales, which are of moderate volume, for the current week have been mainly confined to dealers. The demand is principally for Steel grades, though foundries are in the market for Cast Scrap. There are no offerings of miscellaneous Scrap by the railroads. Relaying Rails, Standard Sections, are in short supply and wanted at full market price. There has been a slight advance made in the price at which certain kinds of material is being held. The tone of the market is strong, and an improvement in the volume of sales is looked for next week. We quote as follows, f.o.b. St. Louis, per gross ton:

Old Iron Rails	$17.00 to $17.50
Old Steel Rails, rerolling	15.50 to 16.00
Old Steel Rails, less than 3 ft.	14.25 to 14.75
Relaying Rails, standard sections, subject to inspection	24.00 to 24.50
Old Car Wheels	16.00 to 16.50
Heavy Melting Steel Scrap	14.75 to 15.25
Frogs, Switches and Guards, cut apart	14.75 to 15.25
Mixed Steel	10.25 to 10.75

The following prices are per net ton:

Iron Fish Plates	$16.00 to $16.50
Iron Car Axles	20.00 to 20.50
No. 1 Railroad Wrought	14.50 to 15.00
No. 2 Railroad Wrought	13.50 to 14.00
Railway Springs	13.00 to 13.50
Locomotive Tires, smooth	13.50 to 14.00
No. 1 Dealers' Forge	11.50 to 12.00
Mixed Borings, &c.	7.00 to 7.50
Machine Shop Turnings	9.50 to 10.00
No. 1 Boilers, cut to Sheets and Rings	10.00 to 10.50
No. 1 Cast Scrap	13.50 to 14.00
Railroad Malleable	12.00 to 12.50
Agricultural Malleable	10.50 to 11.00
Pipes and Flues	10.50 to 11.00
Railroad Sheet Scrap	10.50 to 11.00

Lead, Spelter, Etc.—The market for Pig Lead is quiet but strong, with sales at 4.25c. to 4.30c. No further reduction, it is said, is looked for by the best informed parties in the trade. The price of Lead Ore is unchanged at $27.50 per 1000 lb., Joplin basis. Spelter is strong at 5.05c. to 5.10c. Very few sales have been made mostly small lots. Producers are holding for higher prices. Zinc Ore is firm at $41 to $42 per ton, Joplin basis. Leading sellers state that at the price at which Ore is held, Spelter at current market quotations is below the cost of production. In the mining district the surplus is practically cleared up, and it is reported that nearly all the mines that closed down on account of low prices earlier in the season will resume production not later than January 1. Tin is off, 10c. per 100 lb.; Copper is ⅛c. up; Antimony is off 10c. per 100 lb. All three metals are in good demand this week.

The Otis Elevator Company reports that it is now quite busy. Among other jobs it is putting six elevators into the new St. Regis' Apartment House, and has the contract from Planters Hotel Company for placing traction elevators in place of the old ones.

The incorporation of the Delaware Tunnel Railroad Company in Pennsylvania and of the Camden Tunnel Railroad Company are the first steps in a project for the driving of two tubes under the Delaware River connecting Philadelphia and Camden. The cost is estimated at $10,000,000. Richard I. D. Ashbridge is to be chief engineer. The principal backers of the project are William A. Stern of Stern & Silverman; Benjamin Wolf and Edwin Wolf of Wolf Bros. & Co., Philadelphia and New York, bankers and brokers.

San Francisco.

SAN FRANCISCO, November 25, 1908.

The condition of the Pacific Coast market on Iron and Steel products has not altered materially in the last two weeks, business in nearly all lines being confined to comparatively small orders. Although the local merchants express a belief that a gradual improvement is taking place, the present month has brought less improvement than was generally looked for, and the total business transacted will probably be no greater than in October. Foundry business is still quiet, and there is no movement of any consequence in either Pig Iron or Scrap. The total tonnage of Merchant Pipe sold is probably a little less than a month ago, though some of the jobbers report more inquiry. The movement of Merchant Steel, Sheets, Plates, and Bars shows some increase, orders being still limited to small lots, but increasing in number. There has been some ordering of Hoop Steel during the wine season, but little more business is expected in this line. No large amounts of Drill Steel have been moved, though more of the mines are coming into the market for small quantities, and larger orders are expected after the first of the year. There is somewhat more inquiry for Boiler Tubes for marine construction and repair work, but the demand is still below normal, although not large on the Coast at any time. There is a more active and stronger market for Cast Iron Pipe, for which numerous small inquiries are being received.

Structural Material.—New contracts for local Structural Steel work since the end of October have not been as numerous as was expected, as the increase in building operations which was looked for after the election has not yet taken place, though figures are being taken on a large amount of work on which contracts may be let at any time. A fair number of small transactions have been closed, besides a few of more importance which, altogether, will bring the tonnage about up to that of last month. The movement of concrete reinforcing material is somewhat larger than it has been of late, both in San Francisco and in other parts of California. Plans have been completed for the new six-story building of Goldberg, Bowen & Co., on Sutter street, near Kearny, which will cost about $135,000. The Berkeley Steel Company has taken a number of contracts for Structural Steel for the stations of the San Francisco Gas & Electric Company. Plans have been completed for a 20-story addition to the St. Francis Hotel. This addition will give the hotel a frontage of an entire block on Powell street. It will probably be some time, however, before work is commenced on this structure. A contract has been let for reinforcing material for the Dunne Investment Company's six-story concrete building, at the corner of Stockton and Ellis streets. Plans are about ready for a 10-story building, at the corner of O'Farrell street and Bagley place, and the structure is to be started as soon as possible. The Law Brothers have secured Eastern capital to the extent of $1,000,000 for the reconstruction of two large buildings. A contract will be awarded shortly for the six-story office building of the San Francisco Gas & Electric Company, on Sutter street, near Powell, the estimated cost of which will be $75,000. The Iron and Steel contract for the Mary Grant Building, on Mission street, near Third, has been awarded to Fennell Bros. The Ralston Iron Works has taken a contract for Structural Steel work on a building at the corner of Market street and Marshall square, for $15,702. The manager of the Pacific Lumber Company, at Scotia, Cal., announces that a new Steel saw mill, a duplicate of the present plant, will soon be built. F. Howe will soon begin the erection of a nine-story Steel frame building in Los Angeles. A new Masonic temple is planned at Sacramento, Cal., to cost about $500,000. The plans, drawn by D. H. Burnham & Co., call for a Class A structure of six stories. The Mortenson Construction Company has taken a contract for the Steel work on a small Steel frame building in Oakland. The Pacific Construction Company is about to begin work on a large jail for Sacramento County, which will cost $161,827. Bids have been submitted for Steel cells, that of the Stewart Jail Company, $31,890 for two tiers and $41,340 for three tiers, being by far the lowest. No award has yet been made.

Rails and Track Supplies.—Rails for mining and logging roads are especially quiet, and the promoters of a number of railroad projects in the interior are still working on preliminary financial arrangements. Some improvements and extensions are to be made in the larger railroad lines, but little business is expected from that source in the Coast market. Considerably more ordering, however, is being done on miscellaneous track supplies for repair work.

Pig Iron.—There is a steady but very slow increase in the amount of foundry work in San Francisco. The ornamental Iron works are busier than they have been for a long time, but this class of work requires very little Pig Iron. Some of the foundries, however, are also getting more work on machinery and other heavy articles, and the market is in a little more promising condition than at last report, as the stocks held by the foundries are gradually decreasing. There is practically no demand for Eastern Pig Iron, as the market is still overloaded with Continental Iron of similar

grade, which is selling at low prices. There is little movement of any grade, and no new quotations have been established on Chinese Pig Iron. No. 1 Eastern Foundry Pig Iron is quoted nominally at $27 to $27.50, but no sales have been made at these prices for some time. Some improvement is looked for after the first of the year.

Cast Iron Pipe.—No transactions of much magnitude have been reported during the last two weeks, but a good number of small orders have been placed for water works for interior towns, amounting in the aggregate to about 300 tons. A large number of inquiries have been received, however, amounting to a very fair tonnage, and the outlook is for an increased tonnage in the near future. The largest inquiry is for the city water plant of Seattle, Wash. In response to the Eastern market prices have advanced considerably. Quotations have been withdrawn for the present, and the new range of prices has not yet been established. Arrangements are being made for a new water system for the town of Placerville, Cal. At the recent local bond election the vote in favor of acquiring the Tuolumne source for the city's water supply was six to one. It now seems likely that the Cast Iron Pipe for the salt water auxiliary fire protection system will be purchased in small amounts as needed. No negotiations have been opened for the Pipe, as none of the cisterns have yet been completed. A project for a high pressure fire protection system is being agitated in Pomona, Cal. I. L. Hamilton has secured the contract for Pipe to convey water from Fish Lake to the town of Medford, Ore.

Merchant Pipe.—No orders of any consequence for Merchant Pipe have been received since last report, and the total tonnage sold this month is not likely to exceed that of October, though some of the jobbers report an increased movement in small lots. While stocks in jobbers' hands are rather small, and some large orders are likely to be placed within a short time, the movement from the manufacturers is rather small at present. Prices are unchanged, the usual differential being quoted on jobbers' carloads, as follows:

	Steel. Black.	Steel. Galv.
	%	%
⅛ to ¼ in.	56.5	40.5
⅜ in.	58.5	44.5
½ in.	60.5	48.5
¾ to 6 in.	64.5	54.5
7 to 12 in.	61.5	46.5
Extra strong, plain ends:		
⅛ to ⅜ in.	49.5	37.5
½ to 4 in.	56.5	44.5
4½ to 8 in.	52.5	40.5
Double extra strong, plain ends:		
½ to 8 in.	45.5	34.5

A contract has been let for the laying of the 6-in. water pine line of the Sante Fé oil interests in the Midway district, at a figure approximating $100,000. The line will be 21 miles in length and will be in operation within four months.

Edward J. Schneider, contracting manager in San Francisco for the American Bridge Company, is expected back from the East in a few days.

Sydney J. Robinson, managing director of the Jessop Steel Works of Sheffield, England, made a visit to San Francisco recently, accompanied by Charles L. Bailey, Canadian manager.

The Stockton Iron Works of Stockton, Cal., contemplates the erection of a business structure on the site now occupied by the machine shops.

The Willamette Iron & Steel Works of Portland, Ore., has received a contract for machinery and boilers for a light draft steamer for the Northern Navigation Company of Alaska. Negotiations are about concluded with this company for three other steamers of the same type.

The Heffernan Engine Works, Seattle, Wash., has secured a contract to convert the Boston Steamship Company's freighter Hyades to an oil burner.

The Craig Foundry Company has been organized in Long Beach, Cal. It is affiliated with the Craig Shipbuilding Company of that place.

The Pacific Gas Engine Works, Eureka, Cal., is making arrangements to rebuild its plant.

The Empire Foundry Company, which recently sold out its lease in Oakland, Cal., to the Western Pacific Railroad, has bought another site and is preparing to erect a new foundry.

Waterhouse & Lester, carriage material and heavy hardware, who recently moved into their new building in San Francisco, are preparing to erect a building for their Sacramento branch.

The Folger Locomotive Company has filed articles of incorporation in Tacoma, Wash., with a capital stock of $1,000,000. The incorporators are W. B. Jones, T. B. Egan, J. A. Van Osel, W. F. Schaffer, J. Loomis and L. W. Pratt.

Professor Maiorana, according to a dispatch from Rome, has succeeded in his tests of wireless telephony between Rome and Magdalena Island, Sardinia, a distance of 250 miles.

Philadelphia.

PHILADELPHIA, PA., December 1, 1908.

Transactions have been on a smaller scale. The large buyers have about covered for the time, and while there are still some few, particularly the Cast Iron Pipe interests, who would place orders for considerable quantities, if their views regarding prices were met, the bulk of the business recently has been done by the smaller buyers, who usually purchase for near future requirements only. Notwithstanding the decreased buying, the Pig Iron market is very strong, prices on all grades being fully maintained, and some producers name prohibitive prices for first quarter delivery. Considerable interest is now being manifested in the matter of tariff revision, and no doubt the discussions before the Ways and Means Committee, in Washington, are having a retarding effect on some buyers. The finished material market has been rather quiet, the holiday having broken up business to some extent, and the aggregate tonnage of orders taken will hardly equal that of the previous week.

Pig Iron.—The market has been bare of any heavy transactions. Consumers who have taken large tonnages during the past month, both for prompt and forward shipment, are practically out of the market. In a number of cases Iron was purchased in anticipation of orders, and at the present level of prices, which have advanced considerably during the past month, buyers prefer to mark time pending further developments. The situation is decidedly strong and, notwithstanding the decrease in buying, prices are being firmly maintained. A number of sellers are still out of the market; others are pretty well sold up, and while there has undoubtedly been an increase in production, the stocks on furnace banks in this territory are reported to be steadily decreasing. Producers are not inclined to increase production until it is seen that the market will absorb the increased output, but idle furnaces are being put into shape so that they could be blown in, if so desired, with practically no delay. The bulk of the business has been confined to Foundry grades. Some few inquiries for deliveries extending over the first half of the year have developed, but little consideration is given by sellers to business of this character. Prices of No. 2 X and No. 2 Plain, standard eastern Pennsylvania Foundry Iron, are very firm. If there is any of the former grade to be had under $17.25, delivered, in this territory, it goes only to favored customers, the bulk of the business being done at $17.25 to $17.50. Some few sellers are holding at an advance of 25c. to 50c. above this for second quarter delivery, but practically nothing is being sold at the higher level. There has been some moderate business in Virginia Foundry Irons, in some cases at top prices, for shipment in the next 60 days, but little tonnage has come into this territory, the bulk going West. Forge Iron has been sold in moderate lots for early delivery at $16.75, delivered, but not a great deal is available for prompt shipment, and neither buyers nor sellers are inclined to do business in large lots for forward delivery. The Steel making grades have been rather quiet, although reports creep out of round tonnages of Basic Iron having been quietly bought in addition to those mentioned in the past few weeks. The only contract which came out during the week was one of 1500 tons for January delivery at a full price. Quotations on this grade appear to be holding very firm, with sellers not over anxious for business. Inquiries for nearly all the various grades are quite large, buyers testing the market in a small way on forward deliveries, but sellers maintaining a strong front, and not encouraging such buying. For delivery in buyers' yards, eastern Pennsylvania and nearby territory, prices range as follows for shipment in December and the first quarter of next year:

Eastern Pennsylvania, No. 2 X Foundry	$17.25 to $17.50
Eastern Pennsylvania, No. 2 Plain	16.75 to 17.00
Virginia, No. 2 X Foundry	17.25 to 17.50
Virginia, No. 2 Plain	17.00 to 17.25
Gray Forge	15.75 to 16.00
Basic	16.50 to 17.00
Low Phosphorus	21.00 to 21.50

Ferromanganese.—Business has been rather dull, the few sales made being of small lots, for rather early delivery. Asking prices are somewhat higher, but not enough business has come out to test the market. For early delivery, quotations range from $45 to $46, Baltimore, with $47, seaboard, named for the first half of next year, but the latter quotation could no doubt be shaded.

Steel Billets.—Sales are still confined to small lots for prompt shipment, although consumers are willing in a number of cases to contract for next year's requirements at the ruling prices, but sellers refuse to accept such business at the time. Prices are firm, ordinary Rolling Steel for delivery in this territory being quoted at $26.20, with Forging Steel at $28.20, subject to the usual extras for high carbons and special sizes.

Plates.—The demand for Plates has not been as large as in the previous week, but a comparatively fair business was placed with some of the mills in this territory. Plates for structural work have been in the best demand, although some moderate quantities of boat Steel were also taken. While the immediate demand has been lighter, there is a

very satisfactory volume of business under consideration, a good portion of which is expected to develop into orders in the near future. Current business enables mills to maintain their recently increased rate of production. Prices are firmly held, and for delivery in this territory range as follows:

	Carloads. Cents.	Parts carload. Cents.
Tank, Bridge and Boat Steel	1.75	1.80
Flange or Boiler Steel	1.85	1.95
Commercial Firebox	1.95	2.00
Marine	2.15	2.20
Locomotive Firebox Steel	2.25	2.30

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G	.15
No. 9, B. W. G	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00

Structural Material.—Business continues largely of a miscellaneous character, but some pretty good sized propositions are pending. Mills in this territory have, however, been taking some good business from other sections, the Bethlehem Steel Company particularly having booked several heavy orders recently from the West. Quotations are unchanged, for delivery in this territory, 1.75c. to 1.90c. being named, according to specifications.

Sheets.—Little change is to be noted in the demand for Sheets. Consumers still order in small quantities, sufficient to meet their immediate and near future requirements, but show little disposition to contract for heavy tonnages. The volume of business continues on a fairly even basis, however, and mills are about able to maintain their full capacity in operation. The following range of prices is quoted for mill shipment, a tenth extra being added for small lots. Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The demand continues of a more or less irregular nature. The bulk of the business placed has been in small lots, and while some mills have increased their output others continue in irregular operation. Prices are firmer and fewer low price Bars are to be had, while some makers hold their product at prices higher than the market. For delivery in this territory Refined Iron Bars range from 1.50c. to 1.55c., Steel Bars 1.55c., Rerolled Bars 1.50c.

Coke.—While no great tonnage of business has been placed, prices for both Foundry and Furnace Coke are decidedly firmer, and in some instances show an advance. Some few contracts have been made for moderate lots, but the demand is not very active. Foundry Coke is quoted at $2.30 to $2.60, at oven, with Furnace Coke $1.85 to $2.10, at oven. For delivery in this territory prices range about as follows:

Connellsville Furnace Coke	$3.85 to $4.10
Foundry Coke	4.20 to 4.50
Mountain Furnace Coke	3.45 to 3.70
Foundry Coke	3.80 to 4.10

Old Material.—The market has a rather quiet appearance, but fully maintains its strength. Steel scrap has not been active, transactions being mostly in small lots. The Baldwin Locomotive Works is understood to have purchased between 2000 and 3000 tons of Machinery Cast, in small lots, at prices close to $16, delivered. Rolling mills are taking small quantities, but the bulk of the business transacted has been between dealers. Prices are practically unchanged, and while to a large extent nominal, range about as follows, for deliveries in buyers' yards, eastern Pennsylvania and nearby territory:

No. 1 Steel Scrap and Crops	$16.25 to $17.00
Low Phosphorus	18.75 to 19.25
Old Steel Axles	21.75 to 22.25
Old Iron Axles	23.50 to 24.00
Old Iron Rails	20.50 to 21.00
Old Car Wheels	16.00 to 17.00
Choice No. 1 R. R. Wrought	19.75 to 20.25
Machinery Cast	16.00 to 16.50
Railroad Malleable	15.75 to 16.25
Wrought Iron Pipe	15.25 to 15.75
New Bundled Sheets	14.50 to 15.00
No. 1 Forge Fire Scrap	13.75 to 14.25
No. 2 Light Iron	10.00 to 10.50
Wrought Turnings	13.50 to 14.00
Stove Plate	13.25 to 13.75
Cast Borings	12.25 to 12.75
Grate Bars	14.25 to 14.75

The Steel Car Forge Company, Ellwood City, Pa., has purchased the property of the Pennsylvania Stove Company at receiver's sale. The site contains 4¼ acres, on which are a number of buildings. J. W. Humphrey, the receiver, sold the patterns and machinery to the Youngstown Foundry & Machine Company some time ago, and these have been removed. The property lies close to that of the Steel Car Forge Company and will be used for extensions.

Pittsburgh.

PARK BUILDING, December 2, 1908.—(*By Telegraph.*)

Pig Iron.—Inquiries have fallen off considerably, but furnaces have sold a good deal of Iron and are firm in their ideas as to prices. A Cleveland Steel company has bought 5000 to 6000 tons of Basic Iron for delivery over first half of next year, part of the Iron being sold by a Cleveland furnace interest at a price netting slightly less than $15.50, Valley furnace, some of the Iron being furnished by another maker on the basis of $15.35, Valley furnace, or $16.25, Cleveland. Another Cleveland buyer has taken 1000 tons of Basic at a price very close to $15.50, Valley furnace. There is not much inquiry for Bessemer, but the market is firm. A sale of 1000 tons of Malleable Bessemer has been made at $16, Valley furnace. We quote Basic Iron at $15.50, Bessemer at $16.50, Malleable Bessemer at $16, all at Valley furnace. The inquiry for Foundry Iron is quiet and we quote No. 2 at $15.50, at Valley furnace, or $16.40, Pittsburgh. We quote Forge Iron at $14.25, Valley furnace, or $15.15, Pittsburgh. Struthers Furnace has gone out of blast for relining and repairs.

Steel.—Sheet and Tin Bars and Forging Billets are moving out more freely on specifications against contracts, and the whole Steel market is firm. We quote Bessemer and Open Hearth Billets, 3⅞ in. and larger, up to and including 0.25 carbon, $25; 0.26 to 0.60 carbon, $1 extra; over 0.60 carbon, $2 extra, all f.o.b. Pittsburgh. For Wheeling, Martins Ferry, Follansbee, Newcastle, Sharon, Steubenville and Washington (Pa.) delivery, half the freight, or 50c. additional, is charged. Sheet and Tin Bars in random lengths are $27.50, f.o.b. Pittsburgh. Forging Billets take $2 advance over Rolling Billets.

(*By Mail.*)

Having entered the last month of the year, with the taking of inventories and closing up the year's business, it is probable that new orders and shipments by the mills will not show up as favorably as in November. A great deal of large work is in sight, but it is not expected that much of this will be placed before the new year. The tariff hearings now going on in Washington have unsettled matters to some extent, some in the trade believing that radical reductions in existing tariff rates are going to be made. The demand for Pig Iron has quieted down to some extent, consumers who have not bought for next year being content to wait, believing the market will not be any higher when they are ready to buy. Some of the dealers have fair sized lots of both Bessemer and Basic Iron which they bought at low prices and which they are offering at lower prices than the furnaces are quoting. Consumers are taking out a fair tonnage on Billets, Sheet and Tin Bars against contracts, and shipments by the mills in November showed a material increase over October The demand for finished Iron and Steel is only fair. There is some inquiry for Coke for next year's delivery, and a few contracts have been placed. The Scrap trade is quiet, but prices are fairly strong.

Ferromanganese.—Although no large sales are reported, the market is firm. We quote 80 per cent. foreign Ferro at $44 to $44.50, seaboard, plus the freight rate of $1.90 a ton, for Pittsburgh delivery.

Ferrosilicon.—The low prices ruling for some time have stirred up consumers, and heavy sales have been made. Upward of 500 tons of 50 per cent. Ferrosilicon has been disposed of at about $62.50, Pittsburgh. Some sellers are quoting $63 to $64, and refuse to sell at lower figures.

Wire Rods.—An inquiry is in the market from a prominent Chain manufacturer for 2500 tons of Basic Rods for delivery next year. Shipments of Rods by the mills on specifications against contracts are fairly heavy. Prices are firm, and we continue to quote Bessemer Rods at $33, Chain Rods $33, and Basic Rods $34, Pittsburgh.

Muck Bar.—There is some inquiry for Muck Bar, and we note a sale of about 250 tons of best grade at $27, Pittsburgh. We quote Muck Bar, made from all Pig Iron, at $27 to $27.50, Pittsburgh.

Skelp.—Prices on Iron Skelp are very firm, at the recent advance, and a good deal of new business has been placed in the past two or three weeks. We quote Grooved Steel Skelp at 1.45c. to 1.50c.; Sheared Steel Skelp, 1.50c. to 1.60c.; Grooved Iron Skelp, 1.75c., and Sheared Iron Skelp, 1.85c., f.o.b. Pittsburgh. A sale is reported of about 500 tons of Sheared Iron Skelp, at 1.85c., Pittsburgh.

Steel Rails.—The Carnegie Steel Company has received new orders and specifications against contracts from two or three of the smaller railroads and several of the traction lines for about 6000 tons of Standard Sections, and has also entered some orders for export. The company has also received new orders and specifications for about 1400 tons of Light Rails, and the three Edgar Thomson mills are on this week but at reduced capacity. As yet none of the trunk lines has placed contracts for Rails for next year, but negotiations have reached the point that indicates some heavy

tonnage will be placed this month. Makers of Light Rails rerolled from Old Rails continue to sell at $2 to $3 a ton under Rails rolled from Billets. Prices on new Light Rails, rolled from Billets, are as follows: $25 for 25 to 45 lb. Sections, with $1 advance for 20 lb., $2 advance for 16 lb., and $3 advance for 12 lb. Standard Sections are $28, at mill, and Angle Splice Bars, 1.65c., at mill.

Structural Material.—Bids went in about a week ago on a viaduct at Denver, about 4000 tons, but the contract has not yet been placed. The Duquesne Light, Heat & Power Company, a local concern, has asked bids on a new Steel building of about 750 tons, while the Fort Pitt Bridge Works is again the lowest bidder on the proposed Steel bridge to cross the Monongahela River at Monongahela City, Pa., about 4000 tons. Bids were asked on the structure several months ago, but for some reason the job was held up and new bids were invited. The Eichleay Company has taken about 150 tons for a hospital at Marshalsea. A good deal of large work is in sight, on part of which bids have gone in. We quote, f.o.b. mill, Pittsburgh: I-Beams and Channels, 3 to 15 in., inclusive, 1.60c., net; I-Beams over 15 in., 1.70c., net; H-Beams over 8 in., 1.80c.; Angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; Angles, over 6 in., 1.70c., net; Angles, 3 x 3 in. and up, less than ¼ in., 1.50c., base, half extras, Steel Bar card; Tees, 3 in. and up, 1.65c., net; Zees, 3 in. and up, 1.60c., net; Angles, Channels and Tees under 3 in., 1.50c., base, half extras, Steel Bar card; Deck Beams and Bulb Angles, 1.90c., net; Hand Rail Tees, 3c., net; Checkered and Corrugated Plates, 3c., net.

Plates.—The Carnegie Steel Company has taken the contract for all the Plates, Shapes and other material for the battleship Utah, to be built by the New York Shipbuilding Company, requiring about 8000 tons, and has also received the signed contract from the T. A. Gillespie Company for the Brooklyn Water Works Steel Pipe job, which will take about 22,000 tons of Plates. Specifications for these Plates will be given in a short time, and they will be rolled at the Homestead Works. The Cambria Steel Company has received an order from the Western Maryland Railroad for 500 all Steel cars, which will be built at its shops, at Johnstown, Pa., and which will require 6000 tons or more of Plates and Shapes. New orders from general consumers, such as Boiler shops and others, are showing some betterment, and prices are firmer, concessions having almost entirely disappeared. Regular prices are as follows: Tank Plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.60c., base, at mill, Pittsburgh. Extras over this price are as follows:

Tank, Ship and Bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. Plate. Steel Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on Plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Locomotive Firebox Steel	.50
Shell grade of Steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.50c., f.o.b. Pittsburgh.

Sheets.—Orders for Black and Galvanized Sheets are being received by the mills in fairly large volume, the actual new tonnage placed in November showing an increase over the previous month. The leading interest is operating to about 60 per cent. of Sheet capacity, and the outside mills are running at about the same rate. The American Rolling Mill Company is operating its Sheet mills at Middletown, Ohio, to full capacity, and four out of five hot mills at its Zanesville Works. Prices are firmer, and cutting has almost entirely disappeared. For shipment from mill regular prices are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets, Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c.; No. 28, Painted Roofing Sheets, $1.75 per square, and Galvanized Roofing Sheets, No. 28, $3.10 per square, for 2½-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—The American Sheet & Tin Plate Company is steadily increasing its active capacity, having started this week the South Sharon, Pa., plant, containing 20 hot mills, and will probably start this month the Greer Works, at New Castle, also containing 20 hot mills, lying idle for some months. Leading Tin Plate makers have received large contracts for Bright Plates from the salmon packers and canning interests, most of them for delivery prior to April 1, and indications are that the mills will be fairly busy the next three or four months. Regular prices on Tin Plate are being well maintained, concessions having practically disappeared. We quote: $3.70 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Hoops and Bands.—Early in January the manufacturers of Hoops and Bands will likely establish prices for 1909 delivery. The Clark Steel Hoop Company, now building a Hoop mill at Punxsutawney, Pa., will be a factor in next year's trade. Occasionally a stray order is placed, but contracts given to the mills early this year have been pretty well cleaned up. It is said that regular prices are being maintained, as follows: Steel Hoops, 1.80c., base, full Hoop card prices; Steel Bands, 1.40c., base, half Steel card extra, all f.o.b. cars, Pittsburgh, in carload lots, for delivery during 1908.

Iron and Steel Bars.—New orders for both Iron and Steel Bars are relatively small, nearly all consumers having placed their contracts some time ago, and on which they are now specifying quite freely. The three leading producers of Steel Bars are operating at present to larger capacity than at any time this year. The recent sharp advance in prices of Iron Scrap has had the effect of strengthening the market on Iron Bars, which is firmer now than for some time. We are advised that regular prices on both Iron and Steel Bars are being maintained. We quote Iron Bars at 1.42c., Pittsburgh, for Western shipment, or 1.60c., Chicago, while the price for delivery in the Pittsburgh District is 1.50c. Steel Bars are firm, at 1.40c., Pittsburgh, for base sizes.

Railroad Spikes.—As yet the railroads and the makers of Spikes have not been able to get together on contracts for delivery over all of 1909 on Spikes at present prices. The makers of Spikes are willing to sell through first half at to-day's prices, but are unwilling to take business for second half. The demand for the smaller sizes continues quite active, and the mills are pretty well filled up. Prices are firm, and we quote: Standard sizes, 4½ x 9-16 in., at $1.70, and the smaller sizes at $1.80 per 100 lb. in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Specifications on Merchant Steel are being received by the mills in fairly large volume, but the number of new orders being placed is relatively light and mostly for small lots. The demand for Shafting is fairly active, and prices are being better maintained than for some time. We quote Cold Rolled Shafting at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory. Regular prices on Merchant Steel, which are being shaded to some extent, are as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 1.90c. to 1.95c.; Railroad Spring Steel, 1.60c. to 1.75c., the higher prices being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron finish, 1½ x ½ in. and heavier, 1.40c.; under 1½ in., 1.55c. Planished Tire Steel is 1.60c., all f.o.b., at mill.

Spelter.—The inquiry for Spelter is a little better and prices are strong. We quote prime grades of Western Spelter at 4.90c. to 4.95c., East St. Louis, equal to 5.02½c. and 5.07½c., Pittsburgh.

Boiler Tubes.—Some fairly large new orders for Boiler Tubes are coming in from the railroads, mostly for repair work, and it is believed that after the first of the year the demand will materially improve. The demand for Merchant Tubes is slightly better. As a whole, the trade in Tubes this year has been very disappointing. The demand has been dull nearly all the year, and prices have been more or less shaded. For Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1⅛ in.	42	47
1¼ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Merchant Pipe.—The demand for the merchant sizes of Pipe is holding up fairly well. The Pipe mills expect a large trade next year, as some important projects are under way, which, if put through, will require a very heavy tonnage of the larger sizes. The mills are absolutely maintain-

ing prices on both Iron and Steel Pipe. Discounts on Steel Pipe, ¾ to 6 in., to the large trade, are 76 and 5 per cent. off list. Regular discounts are as follows:

Merchant Pipe.

	Jobbers, carloads, Steel.	
	Black.	Galv.
	%	%
⅛ to ¼ in.	67	51
⅜ in.	69	55
½ in.	71	59
¾ to 6 in.	75	65
7 to 12 in.	72	57
Extra strong, plain ends:		
⅛ to ⅜ in.	60	48
½ to 4 in.	67	55
4½ to 8 in.	63	51
Double extra strong, plain ends:		
½ to 8 in.	56	45

Discounts on Genuine Iron Pipe are as follows:

	Black.	Galv.
	%	%
⅛ to ¼ in.	65	..
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

Iron and Steel Scrap.—The week has been quiet, and it is likely this condition will continue during this month, as leading consumers will be taking inventory, and will take in as little Scrap as possible. An embargo has been placed by the railroads on Scrap for delivery to the Allegheny Steel Company, which has recently been a large buyer of Borings and Turnings, and this embargo may have the effect of slightly weakening prices in these two products. The tone of the Scrap market is not quite as firm as it was a week or two ago, but as yet there is little disposition on the part of dealers to shade prices. Heavy Steel Scrap, $16.50 to $16.75, for Pittsburgh, Sharon, Steubenville or Leechburg, Pa., delivery; for delivery at Monessen, Pa., which takes a higher freight rate, $17 has been quoted. Cast Iron Borings are $11 to $11.25; Bundled Sheet Scrap, $13.50 to $13.75; No. 1 Busheling Scrap, $14.75 to $15; No. 2, $10.75 to $11; No. 1 Cast Scrap, $14.75 to $15; Iron Axles, $24 to $24.50; Sheet Bar Crop Ends, $18.50 to $18.75; Rerolling Rails, $18.50, delivered Cambridge, Ohio, and $19 to $19.50, delivered Cumberland, Md.; Low Phosphorus Melting Stock, $18 to $18.25; Steel Axles, $19.50 to $20; Scrap Bars, $13 to $13.25; Machine Shop Turnings, $12.25 to $12.50; Railroad Wrought Scrap, $16.75 to $17; Railroad Malleable Scrap, $15 to $15.50; Iron Rails, $18.75 to $19, and Locomotive Tires, $17 to $17.25, all per gross ton, f.o.b. Pittsburgh, unless otherwise stated.

Coke.—Some inquiries for Furnace Coke are in the market for delivery through first half of next year, one consumer asking for 4000 tons a month and another consumer 5000 to 10,000 tons a month. One leading Coke concern has sold a heavy tonnage of Furnace Coke for delivery in first half at $2, at oven, and we quote strictly Connellsville Furnace Coke for first half delivery at $2 to $2.15, per net ton, at oven. Connellsville 72-hr. Foundry Coke for first half delivery is held at $2.25 to $2.40, most makers asking the higher price. Connellsville Furnace Coke for prompt delivery is very firm, at $1.85 to $1.90, and we quote a sale of about 2000 tons at $1.90. The output of Coke last week was 220,145 tons, a decrease over the previous week of about 8000 tons. A good many Coke plants are still crippled by lack of water.

The W. R. Beatty Machinery & Equipment Company, manufacturers' agent and dealer in new and second-hand machinery, making a specialty of forging plant equipment, has moved its offices from 613 to 410 House Building, Pittsburgh. Larger offices have there been secured to take care of the growing business.

Birmingham.

BIRMINGHAM, ALA., November 30, 1908.

Pig Iron.—Since last report three leading producing interests in this territory have practically withdrawn from the market, but values are apparently unaffected. The demand for prompt shipments and for delivery during the first quarter is being met with prices on a basis of $13, Birmingham, for No. 2 Foundry, although those concerns that immediately after the election adopted a higher basis are unwilling to make concessions, and report some sales at the figures asked. There is no established quotation on deliveries further advanced than the first quarter, by reason of the fact that the demand for such deliveries has taken no definite form, but it is understood that in a number of cases recent engagements on the $13 basis are subject to an extension of deliveries into the second quarter. Among the latest sales reported is 600 tons for the first quarter at $13.50, Birmingham. A lot of 1000 tons of Gray Forge for first quarter delivery sold at $11.50 per ton, Birmingham; 600 tons of No. 3 Foundry, for delivery during the next three months, sold at $12.50, and 850 tons of No. 2 Soft brought $13. Comparatively small lots of Clifton High Manganese Iron recently sold at $14 per ton for No. 2, and chilling grades of Charcoal Iron are firm, at $20 per ton, at furnace. A leading Water Pipe manufacturer is in the market for a round tonnage of Foundry grades, and the aggregate of comparatively small orders for spot delivery in sight is fairly attractive. The fact that two new foundries will commence operations during the month of December is a significant one, and the enlargements to others that are under consideration can but indicate a period of greater activity when inventories have been taken, and the general status of individual affairs more definitely determined.

Cast Iron Pipe.—The principal letting reported during the week just ended was 1000 tons of Water Pipe for the city of Spokane, Wash. This tonnage was awarded the American Cast Iron Pipe Company, Birmingham, Ala., and will be furnished during the early months of next year. Orders for small municipalities have recently come forward in greater volume, and the proportions of each form a consideration more significant with prices fairly satisfactory. It is believed that published quotations more nearly represent the market price for large contracts than at any time for many months. The increased cost of raw material is no doubt the prime factor in the amelioration of market conditions, and in view of the fact that indications are favorable for the maintenance of prices now being asked for such material, Pipe manufacturers manifest indifference as to increased proportions of order book requirements under the existing conditions. We quote Water Pipe as follows, carload lots, per net ton, f.o.b. cars here: 4 to 6 in., $24; 8 to 12 in., $23; over 12-in., average $22, with $1 per ton extra for Gas Pipe.

Old Material.—Stock accumulations are being increased wherever practicable and asking prices are not revised. The actual movement from dealers' yards shows little improvement, but the consumption is known to be gradually increasing, and additional announcements to those previously published are made of the resumption of operations at idle mills. We quote dealers' asking prices as follows, which are believed to be firm, per gross ton, f.o.b. cars here:

Old Iron Rails	$14.50 to $15.00
Old Iron Axles	16.00 to 17.00
Old Steel Axles	13.00 to 13.50
No. 1 Railroad Wrought	13.50 to 14.00
No. 2 Railroad Wrought	10.50 to 11.00
No. 1 Country Wrought	11.00 to 11.50
No. 2 Country Wrought	9.50 to 10.00
No. 1 Machinery	11.00 to 11.50
No. 1 Steel	10.00 to 10.50
Stove Plate and Light Cast	9.50 to 10.00
Cast Borings	5.00 to 5.50

Buffalo.

BUFFALO, N. Y., December 1, 1908.

Pig Iron.—The bulk of the business placed for the past week has been in larger lots than for the preceding two or three weeks, ranging from 500 to 10,000 tons. The demand continues strong for all grades; but the dropping off in the smaller orders tends to give the market a quieter aspect, notwithstanding the aggregate sales are larger. There is considerable tonnage under inquiry which is not yet placed owing to the fact that prices have stiffened slightly. One of the largest of the local furnaces has withdrawn from the market until after the first half of next year, being booked to capacity until that time. Prices are fairly represented by the following quotations, f.o.b. Buffalo:

No. 1 X Foundry	$16.25 to $16.75
No. 2 X Foundry	15.75 to 16.25
No. 2 Plain	15.50 to 15.75
No. 3 Foundry	15.25 to 15.50
Gray Forge	15.00 to 15.25
Basic	16.00 to 16.50
Malleable Bessemer	17.00 to 17.50
Charcoal	20.25 to 20.75

Old Material.—The market is about the same as last week, with a continuance of the wide variance of opinion as to present values between dealers and consumers, with the result that very little business is being transacted. Most dealers are holding until after the first of the year, when they expect to realize higher prices. The week has developed a demand for Borings which have advanced slightly. We quote dealers' prices as follows, per gross ton, f.o.b. Buffalo:

Heavy Melting Steel Scrap	$15.50 to $16.00
No. 1 Railroad Wrought	17.00 to 17.75
No. 1 Railroad and Machinery Cast Scrap	14.75 to 15.50
Old Steel Axles	19.00 to 20.00
Old Iron Axles	23.00 to 24.00
Old Car Wheels	17.00 to 18.00
Railroad Malleable	14.50 to 15.00
Boiler Plate	13.00 to 13.50
Locomotive Grate Bars	12.50 to 13.00
Pipe	12.50 to 13.00
Wrought Iron and Soft Steel Turnings	9.50 to 10.00
Clean Cast Iron Borings	8.50 to 9.00
No. 1 Busheling Scrap	14.50 to 15.00

Finished Iron and Steel.—There is continued improve-

ment in inquiry, and a good line of orders coming in for Bars, railroad material and other finished products, with a fair volume of specifications on contracts. Plans and specifications are being prepared for a four-story factory addition to the Crosby Company's metal stamping plant here, requiring about 250 tons of Structural Material, which will be ready to be figured on after the first of the year. All bids on the Schenectady County Court House, at Schenectady, have been rejected, and new plans are to be drawn and the work readvertised.

Cincinnati.

CINCINNATI, OHIO, December 2, 1908.—(*By Telegraph.*)

November furnished the banner record of the year in business activity, although in the finished lines it was more of future promise than in actual sales. Local Pig Iron sellers report their November business as the greatest for many years, one large agency announcing it as its most important month in its 13 years' existence; another that its order books showed the best sales since August, 1906, which was a record breaker. This week business has slumped off somewhat, and inquiries are fewer for Pig Iron, but in machinery there have been some splendid orders placed, notably in the ice machine line. There is talk among representative furnacemen of the South of a revival of the commissioner plan for Pig Iron sales, and an elimination of the commission men, but as this has been up a number of times before without result not much attention is given it. Scrap dealers are not so united in the matter of prices as heretofore, although the majority of them are still forcing prices upward, particularly on Heavy Melting Steel.

Pig Iron.—The most interesting bit of gossip here today is the reported purchase quietly by the largest Pipe interest of between 30,000 and 40,000 tons of Southern Iron for delivery to its Southern plants. Otherwise the market is quiet, and a number of inquiries mentioned in last week's report are understood to be still pending. There is considerable inquiry for third and fourth quarter delivery, but furnaces, for the most part, are very chary of quoting for the last half, although $14, Birmingham, can be done on Southern, and $13.50 on second quarter alone and extending into third quarter. The price of $13 is firm for first quarter, and the best heard for deliveries extending into the second quarter is $13.25. Northern Irons are firm at $15.50, at furnace, and a number of makers are asking $16 for spot business and extending through first quarter. For the first half it is reasonably certain that $15.75 can be done. Rumors of some Southern resale Iron at $12.50 to $12.75 are heard, but the quantity is said to be so limited as to cut no figure in the market. Ohio Silveries, 8 per cent. Silicon, are still quotable at $18.50, at furnace. Malleable Iron is quite dull, which suggests to sellers that the railroads are still withholding business. While dealers agree that December has opened very quietly, the feeling is that consumers who have not covered for the second quarter and beyond must come into the field within the next two weeks and before the holiday lethargy sets in. Southern Indiana and Louisville stove manufacturers have bought considerable Iron during the week, most of the orders going to Southern furnaces. The inquiry from a central Indiana foundry interest for No. 1 Soft and No. 2 Foundry is said to be still in abeyance, as is also that from a large northern Indiana agricultural implement manufacturer who wanted Standard Bessemer, Charcoal Iron and Foundry aggregating something like 15,000 or 20,000 tons. Northern Indiana foundry and machine interests are also said to be negotiating. A local foundry is asking for prices on 500 tons of Foundry Iron. The local melt is improving but slowly, and most large melters have considerable Iron on their yards. There is a scarcity of low grades in the South, and Forge is firm at $11.50, Birmingham. There is said to be an accumulation of White Iron, which is held at about $10.50 to $11. For delivery balance of the year and for the first quarter we quote, based on freight rates of $3.25 from Birmingham and $1.10 from the Hanging Rock District, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$16.75 to $17.25
Southern Coke, No. 2	16.25 to 16.75
Southern Coke, No. 3	15.75 to 16.25
Southern Coke, No. 4	15.25 to 15.75
Southern Coke, No. 1 Soft	16.75 to 17.25
Southern Coke, No. 2 Soft	16.25 to 16.75
Southern Coke, Gray Forge	14.75 to 15.25
Southern Mottled	14.50 to 15.00
Ohio Slivery, 8 per cent. Silicon	19.60
Lake Superior Coke, No. 1	17.10 to 17.60
Lake Superior Coke, No. 2	16.60 to 17.10
Lake Superior Coke, No. 3	16.10 to 16.60
Standard Southern Car Wheel	22.25 to 23.25
Lake Superior Car Wheel	21.75 to 22.75

(*By Mail.*)

Coke.—The most noteworthy incident of the late week is probably the lighting up of some 1500 or 2000 ovens in the Pocahontas region, in the Norfolk & Western territory. Four furnaces going into blast in that section made this possible. In other fields there is no special activity, the needs of most Southern furnaces having been already supplied for the first half. Pocahontas Furnace Coke is quotable in this market at $1.85 to $1.90, at oven, for first half delivery, and Wise County about the same; Connellsville, from $1.75 to $2.25, dependent on brands and deliveries. There is still a lamentable lack of interest in Foundry brands, and the price remains at an attractive figure, namely, $2 to $2.40, according to brands and deliveries. Pocahontas Foundry is obtainable at $2.15 to $2.25; Wise County about the same; Connellsville 72-hr., $2 to $2.40, all at oven. The drought continues to prevail in important producing sections.

Finished Iron and Steel.—Dealers are not enthusiastic over current conditions, but very hopeful for the future, the tenor of correspondence indicating a revival early in the coming year. Collections are not good, and many promising specifications that came out directly after election seem to be temporarily shelved. There is considerable talk of the advance in Bar Iron of $2, but dealers do not expect it to have any effect on present prices to the trade. There will be several large Structural jobs for specifications early in the year, but new things in this line for the balance of the year are scarce. Prices, f.o.b. Cincinnati, are as follows: Iron Bars, carload lots, 1.55c., base, with half extras; small lots from store, 1.85c., base, half extras; Steel Plates, carload lots, 1.75c., base with half extras; small lots from store, 1.85c., base, half extras; Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, ¼-in. and heavier, carload lots, 1.85c.; small lots from store, 2c.; Blue Annealed Sheets, heavy, No. 16, carload lots, 2.15c.; small lots from store, 2.50c.; No. 14, carload lots, 2.05c.; small lots from store, 2.40c.; No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; No. 12, carload lots, 2c.; small lots from store, 2.30c.; Sheets (Light), Black, No. 28, carload lots, 2.65c.; Galvanized Sheets, No. 28, carload lots, 3.70c.; Steel Tire, 4-in. and heavier, carload lots, 1.95c.; Plates 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Material.—The present week finds dealers not quite so united on the price question, and on some items the spread is as much as $1 to $2 a ton. There have been some heavy sales of Melting Steel, one large concern announcing that it alone since election has disposed of 35,000 tons. Most other lines of Scrap are quiet, and not much is expected until after the holiday season. Consumers are not much in evidence, and the post-election activity has been furnished largely by the dealers who were trying to cover before the market had steadied to firm proportions. There has been considerable interest manifested in Rerolling Rails, and in Old Iron Rails the greatest difference of opinion exists between certain large dealers; one quoting $14 to $15, another $16 to $17, and in lesser degree the same difference between them on long and short Old Steel Rails. As nearly as the market can be gauged in the light of this difference of opinion dealers' prices to the trade are as follows, which are f.o.b. Cincinnati:

No. 1 R. R. Wrought, net ton	$13.50 to $14.50
Cast Borings, net ton	5.50 to 6.00
Heavy Melting Steel Scrap, gross ton	15.50 to 16.00
Steel Turnings, net ton	6.00 to 7.00
No. 1 Cast Scrap, net ton	13.00 to 14.00
Burnt Cast, net ton	9.00 to 10.00
Old Iron Axles, net ton	16.75 to 17.75
Old Iron Rails, gross ton	15.00 to 16.00
Old Steel Rails, short, gross ton	13.00 to 14.00
Old Steel Rails, long, gross ton	13.00 to 14.00
Relaying Rails, 56 lb. and up, gross ton	21.50 to 22.50
Old Car Wheels, gross ton	15.00 to 16.00
Low Phosphorus Scrap, gross ton	14.00 to 15.00

Cleveland.

CLEVELAND, OHIO, December 1, 1908.

Iron Ore.—The shipping season is practically at an end. The December movement will be very light, probably not over a dozen cargoes. The last boats will leave the upper lake ports not later than Saturday noon, when the insurance expires. There is some speculation among Ore men as to when the buying movement for next year will begin. This year it was well along in the summer before it got fairly started, but the heavy buying for shipment in 1906 and 1907 took place in November of the year before. Ore men do not expect that there will be any activity for the coming year before the latter part of January and perhaps it may be later. The question of next year's prices has as yet been given no consideration by the Ore men. The tonnage on the docks is somewhat larger than on December 1 last year. Ore is moving fairly well from docks to furnace yards. Prices at Lake Erie docks per gross ton are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; Old Range Non-Bessemer, $3.70; Mesaba Non-Bessemer, $3.50.

Pig Iron.—The local market has quieted down. The market in the Toledo territory, however, has continued fairly active, and several sales of Foundry Iron for first half delivery are reported. The largest sale was a 5000-ton lot, with one of 3000 tons, and some of smaller quantities. Although the names of the large purchasers are withheld, it is known that Michigan stove foundries have been in the market during the past few days for considerable Foundry

Iron. The sales have been made at $16, Toledo, furnace, for No. 2 Foundry, for first half delivery. We also note the sale of 900 tons, half No. 2 Foundry, and half Malleable, for December delivery, at $15.75, Toledo furnace. Inquiries in this immediate territory are all for small lots, 500 tons and less, the inquiries coming from some of the smaller foundries that did not buy during the recent active market. The price generally quoted for No. 2 Foundry Iron is $16, Valley furnace, for first half delivery. Furnaces that are well sold up for the first quarter are holding firmly to this price, but it is understood that one or two furnace interests that are still actively seeking business are shading this price to about $15.50, for shipment to some points where competition is sharp. A local interest is staying practically out of the market by quoting $17, at furnace, for No. 2. Shipping orders on contracts show improvement. The stocks in local furnace yards have been largely reduced. The River Furnace of the Upson Nut Company, which has been out of blast for relining, will probably be blown in early this month. There is still considerable inquiry for Basic Iron, and a local interest reports the sale of about 1000 tons at $16, Valley furnace, for December delivery. There is a slight improvement in inquiries for Malleable Iron. Foundry Iron interests expect the market to remain quiet for the balance of the year, and that there will not be another active buying movement until well along in January. For the balance of the year we quote, delivered, Cleveland, as follows:

Bessemer	$17.40 to $17.90
Northern Foundry, No. 1	17.25 to 17.75
Northern Foundry, No. 2	16.75 to 17.25
Northern Foundry, No. 3	16.25 to 16.75
Gray Forge	15.00 to 16.00
Southern Foundry, No. 2	17.35
Jackson County Silvery, 8 per cent. Silicon	20.05

Coke.—The market is firm and the demand is fairly good. Foundrymen continue to cover for their requirements for the first half. We quote Standard Connellsville Furnace Coke at $1.80, at oven, for spot shipment. For the first half the price is firm at $2, at oven. For delivery the first half of next year we quote Connellsville 72-hr. Foundry Coke at $2.25 to $2.40, at oven.

Finished Iron and Steel.—Considerable new business has developed and specifications are holding up fairly well, although the tonnage ordered was not quite as large as during the previous week. Mill agents, however, seem to be quite well satisfied with the amount that is being taken on contracts. While jobbers are taking very little for mill shipment, their warehouse business is quite good, having improved considerably during the past month, and they are specifying quite freely for stock. The lake shipbuilding industry shows further improvement. During the week the American Shipbuilding Company closed contracts for two new freight boats for 1909 delivery. One will be a 376-ft. boat, to be built at the Wyandotte plant for the Michigan Alkali Company, and the other will be a 524-ft. freighter that will be built for a furnace interest east of Buffalo. This makes six freight boats that the company has under contract for 1909 delivery. These orders have resulted in the placing of contracts for a portion of the material required for their construction. The Jones & Laughlin Steel Company has been given a contract for 1000 tons of Plates and 1000 tons of Shapes for one of the boats, specifications for which are to be furnished at once, and a contract for 1700 tons of Plates and Shapes has been given to the Carnegie Steel Company. Another contract for 1300 tons of Plates for the shipbuilding company is pending. The Structural market is somewhat more active as a result of the action of the mills in allowing contracts to be made for delivery until the end of the coming year. The largest contract closed is one with a bridge company in Ohio for 2500 tons. Some inquiries are coming from the railroads for Structural Plates and Shapes for repair work. Mills are getting good specifications for special Shapes, which come under the Steel Bar classification, from implement makers and automobile builders. Local jobbers have withdrawn their quotation of 1.35c., Pittsburgh, for Iron Bars, and local mills have advanced their price and are now quoting on the basis of 1.50c., Pittsburgh. Another interest is quoting Iron Bars on the basis of 1.40c., Pittsburgh, for Cleveland delivery. The demand for Iron Bars is still light. One of the local Bar mills is running, but the other will probably be shut down for some time. The demand for Plates shows a slight improvement, some specifications now coming in from consumers of Tank Plates. There is also an improvement in the demand for Black and Galvanized Sheets in small lots. Prices on both Plates and Sheets are firmer, the regular prices now being fairly well maintained. The Wheeling & Lake Erie Railroad, which had an inquiry out for 3000 tons of Standard Section Rails last week, has placed its contract. We quote Iron Bars, 1.50c., Cleveland, for car lots; Steel Bars, 1.50c., Cleveland, for car lots, half extras; Beams and Channels, 1.70c., Cleveland, and Plates, ¼-in. and heavier, 1.70c., Cleveland. We quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. Jobbers quote Iron and Steel Bars out of stock at 1.65c. to 1.70c. Beams and Channels from warehouse are 2c., and Plates, ¼-in. and heavier, 1.90c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.80c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 65 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 71 per cent. discount.

Old Material.—The market continues very firm, and a further advance in the price of several grades is noted. Business is fairly active, but the transactions are mainly among dealers. More inquiries are coming from consumers, but few actual sales to the mills are reported. Dealers are looking for still higher prices, and are not anxious to make sales of accumulated stocks at present prices. The flurry of short covering which caused a sharp advance in prices a week ago has subsided, dealers succeeding in covering on contracts. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$17.00 to $17.50
Old Iron Rails	19.50 to 20.00
Steel Car Axles	20.50 to 21.00
Old Car Wheels	16.00 to 16.50
Heavy Melting Steel	15.50 to 16.00
Relaying Rails, 50 lb. and over	22.00 to 23.00
Railroad Malleable	14.50 to 15.00
Agricultural Malleable	13.50 to 14.00
Light Bundled Sheet Scrap	9.50 to 10.00

The following prices are per net ton, f.o.b. Cleveland:

Iron Car Axles	$20.50 to $21.00
Cast Borings	9.00 to 9.50
Iron and Steel Turnings and Drillings	10.00 to 10.50
Steel Axle Turnings	11.00 to 11.50
No. 1 Busheling	14.00 to 14.50
No. 1 Railroad Wrought	15.50 to 16.00
No. 1 Cast	14.00 to 14.50
Stove Plate	12.00 to 12.50
Bundled Tin Scrap	9.00

Metal Market.

NEW YORK, December 2, 1908.

Pig Tin.—The statistics of the Tin trade as compiled by C. Mayer were unfavorable to holders of the metal. The visible supply increased 2429 tons, the total visible supply at the end of November being 19,953 tons, the largest since the end of May, 1899, when it was 20,485 tons. This was somewhat of a surprise to the trade, and was followed by a sharp decline in price. Consumption was larger than in previous months, deliveries in the United States being 3300 tons, but what made the great difference was the shipment from the Straits, which were nearly 6000 tons. The stock in the United States now amounts to 2193 tons, which is larger than for several months past, and is sufficient for all needs. The visible supply has increased by working both ends against the middle. Production this year has increased and consumption decreased, shipments from the Straits being over 6600 tons larger than last year, and the deliveries in the United States 3200 tons smaller the first 11 months this year than the same period last year. One of the reasons for the present dullness in the Tin trade is the fact that much Tin sold in October and last month was for late November and early December delivery. As this Tin is now being delivered, there is no necessity for consumers buying any more. Some interest is manifest in future Tin, but it is not heavy, and the entire trade is quiet. Price changes during the week show a steady decline, the daily range being as follows:

	Cents.
November 25	30.30 to 30.35
November 27	29.85
November 30	29.70
December 1	29.60
December 2	29.40

There are afloat for American ports 2837 tons. The London market is again lower, closing to-day at £133 15s. for spot and £135 15s. for futures.

Copper.—Trade has been very quiet, although consumers of Lake Copper are working steadily at approximately full time. The Wire trade, however, which consumes the bulk of the Electrolytic Copper, is still quiet. The successful flotation of a loan for the telephone companies this week may mean some Wire business in the future. The lack of success when this company was in the market for money about two years ago was the signal for the collapse of the Copper market. Prices of Lake are steady, at 14.50c. to 14.62½c. Electrolytic is obtainable at 14.50c., delivery 30 days, or 14.25c., net cash, f.o.b. New York, exporters' terms. The exports of Copper for the month of November amounted to 19,146 gross tons. The total exports for the first 11 months of this year amounted to 268,153 tons. In the same period last year the exports were 191,151 tons. The imports of Copper Ore and Matte for October reduced to Copper Contents were 12,700 tons, the largest month on record. The total for the first 10 months of this year was 74,400 tons, compared with 106,200 tons for the same 10 months last year. This shows that the import movement has definitely turned. Viewed another way, the net exports for the month were less than 7000 tons. The London market closes to-day at £63 for spot and £64 for futures.

Pig Lead.—The market is dull, but prices are practically

unchanged, the leading interest offering shipment Lead in 50-ton lots at the unchanged price of 4.30c., New York. Independent producers are asking 4.35c. to 4.37½c., New York, and 4.20c. to 4.22½c., St. Louis.

Spelter.—Prices on Spelter are again higher, and 5.20c., New York, seems to be the ruling quotation. This corresponds to 5.05c., St. Louis. Some January Spelter is offered at 5.17½c., New York, or 5c., St. Louis. The activity in Spelter is not very pronounced.

Aluminum.—The prices of Aluminum are unchanged at 24c. for No. 1 Ingots, 32c. for Rods and Wire and 34c. for Sheets. There is quite a stock of Aluminum here, which nets the holders between 25c. and 27c. This was bought abroad in anticipation of undercutting the producers here, but the importers are sick of their bargain.

Nickel.—Prices are unchanged at 45c. for 10-ton lots and 50c. to 60c. for smaller quantities.

Antimony.—No business has developed and prices continue without change. Hallett's is held at 8.12½c. to 8.25c., Cookson's at 8.37½c. to 8.50c. and outside brands at 8c.

Tin Plates.—The market is quiet and prices are unchanged, at $3.70, Pittsburgh, and $3.89, New York. In Swansea, Welsh Plates are unchanged, at 12s. 3d.

Old Metals.—Consumers are buying only sparingly, and the only activity in the market is the buying by dealers who are anticipating better business after January 1. Selling prices are as follows:

	Cents.
Copper, Heavy and Crucible	13.50 to 13.75
Copper, Heavy and Wire	13.25 to 13.50
Copper, Light and Bottoms	12.00 to 12.25
Brass, Heavy	9.50 to 9.75
Brass, Light	7.50 to 7.75
Heavy Machine Composition	12.50 to 13.00
Clean Brass Turnings	8.50 to 9.00
Composition Turnings	10.50 to 11.00
Lead, Heavy	4.25
Lead, Tea	4.00
Zinc Scrap	3.75

New York.

NEW YORK, December 2, 1908.

Pig Iron.—The market is quieter, but is firm. There have been some sales of round blocks of Foundry Iron in New England and in this district, including several lots of 2000 and 3000 tons. New England interests have purchased about 7000 tons of Malleable Iron, and an inquiry for 6000 tons for the Philadelphia District is in the market. There is still some unsatisfied demand from Pipe makers. We quote, at tidewater, $17.50 to $17.75 for No. 1 Northern Foundry; $17 to $17.50 for No. 2 Foundry, and $16.15 to $16.50 for No. 2 Plain. Alabama Irons are quoted $17.50 to $17.75 for No. 1 Foundry and $17.25 to $17.50 for No. 2 Foundry.

Steel Rails.—An occasional order for a few thousand tons comes up. The Central of New Jersey is understood to have taken about 6000 tons of Open Hearth Rails, and at Pittsburgh orders for 7000 to 8000 tons of Bessemer Rails were placed last week, including 3000 tons for the Wheeling & Lake Erie. We quote $28, at mill, for Bessemer, and $30 for Open Hearth Rails. A recent inquiry from one road presented alternative specifications which it was the evident expectation of the road's engineers would be responded to by varying quotations. It appears, however, that the mills make no distinctions except those provided for in their sliding scale of charges for high percentage cropping.

Structural Material.—Following a record of more than 100,000 tons of fabricated Steel placed in November, December has made a good start, and from what is known of the business pending a total of fully 100,000 tons is looked for for this month. Last week made a remarkable record, with 29,000 tons taken by outside companies and 28,000 tons by the American Bridge Company. Of work that has been bid on, at least half of which is counted on to come on the books this month, there is 100,000 tons. Some of this is public work, and therefore uncertain. In addition are inquiries amounting to about 70,000 tons, on which bids have not been made, and practically none of this is subject to political contingencies. The American Bridge Company has received the order for 10,000 tons of Steel for the second Open Hearth building at Gary, Ind., and two Bar mills will come along later for the same plant. The Northern Pacific receives bids this week on 8500 tons of Steel for bridges, this representing its calculated requirements for 1909. The Chesapeake & Ohio and the Baltimore & Ohio are each in the market for about 500 tons of bridges, and the Lackawanna has placed 900 tons, which is presumed to represent its requirements for 1909. The Cambria Steel Company has taken three contracts recently, one being for a cement works at Alsen, N. Y., requiring about 1100 tons. The Steel for the Hudson County Highway Bridge over the Hackensack River in New Jersey, 500 tons, goes to the American Bridge Company. On plain material contracts with dealers are now made for the first quarter of 1909, while sales to manufacturers are made with deliveries covering the first half, and in some cases the entire year. We quote, as follows, for tidewater deliveries, mill shipments: Beams, Channels, Angles and Zees, 1.76c.; Tees, 1.81c. On Beams, 18 to 24 in., and Angles, over 6 in., the extra is 0.10c. Structural Material, cut to lengths, is sold in small lots at 2¼c.

Ferroalloys.—The market for Ferromanganese is broader, and, strange as it may seem, some inquiries have been made for the last half of 1909 delivery. The price is steady at $45, seaboard. The demand for 50 per cent. Ferrosilicon has lagged considerably and prices are uneven, ruling around $64 to $65, at makers' works.

Bars.—The Bar Iron market is quiet, but firm, with quotations ruling from 1.51c. to 1.56c., tidewater. Steel Bars are unchanged, at 1.56c., tidewater.

Plates.—The local market is without any special movement, the demand being confined to small lots. Prices on standard sized Plates are firmly held as follows: Sheared Plates, 1.76c. to 1.86c.; Flange Plates, 1.86c. to 1.96c.; Marine Plates, 2.16c. to 2.26c.; Firebox Plates, 2.65c. to 3.50c., according to specifications.

Cast Iron Pipe.—Current business consists of small lots ordered for quick shipment for immediate use. Several inquiries consisting of a few hundred tons each have been received for spring delivery, on which manufacturers are quoting about $1 per ton advance. On carload lots of 6 in. for immediate shipment, the price is unchanged, at $24 per net ton, at tidewater.

Old Material.—Dealers are manifesting greater interest in the market than consumers. The latter are buying some Steel Scrap and some rolling mill stock, but otherwise are doing little. Dealers, however, appear to have sold quite freely some time ago, and are now actively endeavoring to fill their contracts, and in notable instances have been obliged to pay considerably more than they will receive. Probably due to this character of buying, prices are stronger, although the general impression prevails that the Iron market will steadily improve and that a higher level of prices is justified. A special transaction was a sale on private terms of 7000 tons of Relayers by a leading railroad, the buyer expecting to hold them for more favorable conditions in the market. Quotations are as follows, New York and vicinity, per gross ton:

Old Girder and T Rails for melting	$13.50 to $14.00
Heavy Melting Steel Scrap	13.50 to 14.00
Old Steel Rails, rerolling lengths	15.50 to 16.00
Relaying Rails	23.50 to 24.00
Old Iron Rails	18.50 to 19.00
Standard Hammered Iron Car Axles	21.00 to 21.50
Old Steel Car Axles	18.00 to 18.50
No. 1 Railroad Wrought	17.00 to 17.50
Iron Track Scrap	14.50 to 15.00
No. 1 Yard Wrought, long	16.00 to 16.50
No. 1 Yard Wrought, short	14.50 to 15.00
Light Iron	8.50 to 9.00
Cast Borings	9.50 to 10.00
Wrought Turnings	10.50 to 11.00
Wrought Pipe	12.50 to 13.00
Old Car Wheels	15.00 to 15.50
No. 1 Heavy Cast, broken up	14.50 to 15.00
Stove Plate	12.50 to 13.00
Locomotive Grate Bars	12.50 to 13.00
Malleable Cast	13.50 to 14.00

William M. Hoffman, formerly with the Tennessee Coal, Iron & Railroad Company, in the Philadelphia territory, has lately become associated with Crocker Brothers, 99 John street, New York. He will represent them in the New York territory in the sale of Pig Iron.

Nash, Isham & Co., Beaver Building, New York, have been appointed Eastern sales agents of the Juniata Furnace & Foundry Company, Newport, Perry County, Pa., maker of the Marshall brand of Pig Iron.

Iron and Industrial Stocks.

NEW YORK, December 2, 1908.

Interest in the stock market has abated considerably and transactions are, therefore, in much less volume. Fluctuations are narrow, indicating that no special influences are operative to move prices up or down to any great extent. Even the tariff hearings at Washington have failed to affect the iron and steel stocks materially. The range of prices on active stocks from Thursday of last week to Tuesday of this week was as follows: United States Steel common 54⅝ to 57, preferred 112¾ to 113⅛; Bethlehem Steel common 23⅛ to 24; Car & Foundry common 46⅛ to 47⅝, preferred 108; Locomotive common 55¼ to 56¾, preferred 109⅝ to 110; Steel Foundries 39⅞ to 40; Cambria Steel 38 to 39; Colorado Fuel 38 to 39⅜; Crucible Steel common 8, preferred 53 to 53⅛; Pressed Steel common 39¼ to 39⅞; Railway Spring common 43 to 43½; Republic common 27 to 27⅞, preferred 87 to 88; Sloss-Sheffield common 78¾ to 80; Cast Iron Pipe common 27 to 28, preferred 75; Can common 9½ to 9⅞, preferred 75⅛ to 76⅞. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 54¾, preferred 112⅝, bonds 102⅜; Car & Foundry common 46¼, preferred 108; Locomotive common 56, preferred 110; Colorado Fuel 38;

Pressed Steel common 39⅝, preferred 97½; Railway Spring common 43; Republic common 27, preferred 86⅞; Sloss-Sheffield common 79½; Cast Iron Pipe common 29¾, preferred 74⅞; Can common 9⅞, preferred 76⅞.

Dividends.—The American Car & Foundry Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock and ½ per cent. on the common stock, payable January 1.

The International Silver Company has declared the regular quarterly dividend of 1 per cent. on the preferred stock, payable January 1.

The Boston Belting Company has declared the regular quarterly dividend of 2 per cent., payable January 1.

The Landis Tool Company, Waynesboro, Pa., has declared an annual dividend of 7 per cent., payable January 1.

Great Britain as a Structural Steel Exporter.

In a recent discussion of the duty on structural steel before the Ways and Means Committee, the point was brought up that American manufacturers sell beams, angles, &c., in Canada in competition with shapes made in Great Britain, although the latter country has the advantage of a preferential rate of duty.

The fact is that for many years Great Britain depended very largely for its beams, which are called "joists" in England, upon the Belgian and German mills, and that particularly Belgium supplied the colonies, among them Canada. The situation has changed somewhat in recent years by the building of modern structural mills in England, but the chief source of the shapes used in the Dominion, outside of our own country, has been Belgium and Germany. The present position of the British structural trade is clearly stated as follows in a paper read before the Staffordshire Iron and Steel Institute, entitled "The World's Export Trade in Iron and Steel, and Its Regulation," by Harold Jeans, editor of the *Iron and Coal Trades Review*, at a meeting at Dudley, November 21, 1908:

For several years foreign steel joists were invariably sold in Great Britain, delivered at important centers of distribution, at prices below the British makers. Especially in the eighties, the imports of joists into this country increased rapidly. This, however, was largely due to foreign engineers, and to architects specifying the use of girders in building work much more largely than was formerly the case in this country. The increased demand led to modern girder mills being erected abroad, which, coupled with large stocks, gave our rivals many advantages. While these still are largely the controlling factors of the situation, the British makers are now fully abreast of Continental ones, and the point has been reached where we are sending considerable quantities abroad. It is not possible to state the quantities exported by different countries, except as estimates, but the following table shows the position so far as Great Britain and Belgium are concerned:

	British imports. Tons.	British exports. Tons.	Total Belgian exports to all countries. Tons.
1904	123,000	50,000	61,000
1905	123,000	64,000	83,000
1906	138,888	107,000	101,000
1907	89,000	106,000	89,000

It will be seen that last year, for the first time, our exports exceeded our imports. Our imports are almost entirely supplied by Belgium and Germany, with increasing quantities from the latter country. Our exports are entirely to markets outside of Europe. Roughly, 60 per cent. go to India and the Colonies and the remainder to foreign countries. Joists have been for some time sold under agreement on the Continent, and the same remark applies to this country. There are comparatively few makers of the larger sections, and the trade should not be difficult to regulate.

The Allegheny Steel Company, Farmers' Bank Building, Pittsburgh, Pa., with open hearth steel plant and sheet mills at Brackenridge, Pa., states that it is not connected in any way with the Western Pennsylvania Steel Corporation, recently granted a charter under the laws of the State of New Jersey, with a capital stock of $700,000. It is reported that the latter proposes to build large sheet and plate mills at Tarentum, Pa., but nothing official has been given out.

New Publications.

Guide Practique du Chimiste Metallurgiste et de l'Essayeur (Practical Guide for the Metallurgical Chemist and Assayer). By L. Campredon. Published by Ch. Beranger, Paris, France, and Liege, Belgium.

The second edition of Campredon's work, for France the classic, has just been issued, the first having been published in 1907. During that time, of course, enormous progress has been made in all the principal industrial countries, and the demands upon the chemist have multiplied and have been diversified greatly. M. Campredon, who is himself at the head of a large commercial laboratory at Saint-Nazaire-sur-Loire, France, has kept close track of the literature of France, Germany, England and this country, and is thoroughly abreast of the times. His presentation of methods is clear and concise, and we like particularly his frequent introductory paragraphs and specific methods in which he explains the chemical principles upon which each is based. Of the whole book of over 800 pages, close to 200 pages are devoted to iron and steel.

The Philadelphia Foundry Foremen.—The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and vicinity was held in that city November 17. Officers for the ensuing year were elected as follows: W. A. Perrine, Abram Cox Stove Company, Philadelphia, president; E. H. McCoy, Stanley G. Flagg & Co., Philadelphia, vice-president; D. M. Kittinger, American Bridge Company, Pencoyd, Pa., secretary; G. M. Benkert, Fairmount Foundry Company, Philadelphia, treasurer. Six new applications to active membership were received and accepted. A paper on "Semisteel" was read by W. P. Cunningham, member, describing the process of making semisteel, the effect of the silicon, sulphur, phosphorus, manganese and carbon in the metal and the importance of having chemical analyses form the basis of procedure in mixing the contents. A discussion followed, in which the results obtained in several experiments were given. At the regular meeting in December, it is the expectation to have Dr. Richard Moldenke present, who will address the association on the subject of "Cupola Practice."

The American Locomotive Company is finding a heavier demand for its products. Several of the leading systems of the country have placed orders in the past 30 days for 10 to 50 locomotives each. Among these are 12 freight oil burning engines of the Mogul type for the Panama Railroad, at $11,950 each. These engines will be turned out at the Brooks plant at Dunkirk, N. Y. The Schenectady plant is now engaged in the manufacture of 55 locomotives for the Chicago & Northwestern, and with the completion of this order it is expected to start on an order for 16 10-wheel passenger engines for the Missouri, Kansas & Texas. A large order for pig iron for 1909 delivery has just been placed by the purchasing department, consisting of 13,500 tons, all of No. 2 foundry, of which 8000 tons will be divided between the Dunkirk and Schenectady plant, and the balance goes to the Paterson, Pittsburgh and Richmond plants. The company has just announced the appointment of W. S. Seamons, Jr., as assistant manager and to be in charge of the Schenectady plant. The position of superintendent of the Schenectady plant has been abolished and the duties will also be assumed by Mr. Seamons.

The New York Central and West Shore railroads will establish, effective December 24, a regulation fixing the minimum carload weight on shipments of scrap at 20 gross tons, except in cases where the marked capacity of the car is less, in which case the minimum carload weight shall not be less than 15 gross tons.

The Machinery Trade.

NEW YORK, December 2, 1908.

The strong feeling of optimism still prevails among machinery merchants, despite the fact that since our last report there has been no further increase in the demand, nor have the larger interests come into the market for important requirements. With the great majority of machinery houses, however, trade is holding up well to the level of the previous few weeks, but there are some who note a falling off in the demand for their products. General conditions appear to be sound, and a gradual resumption to normal business is confidently looked for in the near future by practically all. Of the business received, which is made up principally of small orders, the greater portion is stated to have come from points west of New York. One company whose trade was formerly centered in the city is now shipping most of its products to other points. This is due to some extent to the inactivity of the larger corporations, including the railroads, many of whose purchasing departments are located here. Aside from the New York Central Railroad, which has been a steady customer in the market for some time and which placed a few orders the past week, the Eastern railroads have purchased but little. In the West houses are figuring on a fair sized list of machine tools for the Union Pacific Railroad, whose director of purchases is located in New York.

The plans of several of the important railroad systems entering New York to electrify part of their systems is of considerable interest to the machinery trade, as the work will necessitate the purchase of a great deal of mechanical equipment. This is one of the new developments which will be of much benefit to manufacturers of electrical equipment especially. It will be remembered that the Pennsylvania Railroad recently placed an order with the Westinghouse Electric & Mfg. Company for $5,000,000, for electrification work, and that the Erie Railroad announced its intention to electrifying part of its system. The New York, New Haven & Hartford Railroad has made application to the Public Service Commission for permission to electrify its main line from New York to Stamford, Conn.

The New York Central & Hudson River Railroad is preparing to buy machinery for its new power house at West Albany, N. Y., and inquiries which the trade has been expecting for a long time are now in the market. The list covers power equipment which will include two 900-hp. engines, boilers to match, and a general line of coal handling and other power machinery needed for a power house of that size. It is understood that an appropriation covering the expenditure has been made, and shortly after the bids are figured up it is thought that the contracts will be awarded.

It has been decided by the Carolina, Clinchfield & Ohio Railroad, Johnson City, Tenn, to locate its general shops at Erwin, about 16 miles from Johnson City. Contract for the grading work has been let and from this it is evident that the company is to go ahead with the work which it has had under consideration for many months. As these are to be the main shops of the road they will likely be of considerable size, and will necessitate the purchase of a great deal of mechanical equipment.

The Hammond Iron Works, Warren, Pa., which is to enlarge its plant to meet the increased demand for its products, expects to purchase rolls, rotary beveler, shears, punches, &c., to equip the new additions. Considerable of the required equipment, including three overhead traveling cranes, has been purchased. The company has let contracts for the erection of two new buildings, one 43 x 190 ft., and the other, 56 x 122 ft., and when these are completed it will have one of the largest plants in the country devoted exclusively to steel tank and steel plate construction.

The Crosby Company, Buffalo, N. Y., which is planning to erect an extensive addition to its plant on Pratt street for the manufacture of stamped sheet metal goods, will purchase six to eight motors with the necessary transformers, shafting, pulleys, belting, &c., three elevators, several large presses and patterns. The company has purchased the Curtiss malt house, having a frontage of 189 ft., which it will remodel into a three-story factory, and after the first of the year will erect a four-story addition of brick and structural steel, giving a total frontage of 400 ft. on Pratt street.

About $65,000 worth of iron working machinery, consisting of screw machines, lathes, milling machines, &c., was destroyed in the recent fire at the plant of the National Mfg. Company, Pembroke, Ont., and most of this machinery will have to be replaced inside of eight months. The company, which has a second plant at Ottawa, which can take care of its work for a few months, has not yet decided upon plans for rebuilding the burned structures. The plant was equipped with a steam plant of 125-hp., and two years ago a large water power near the plant was developed, and the company installed a complete electrical equipment. As soon as plans are in shape it is likely that the company will ask bids for the required machinery.

Bids have been sent in for two traveling cranes to be used in the shops to be constructed at Plattsburgh, N. Y., by the Lozier Motor Company, which recently placed contracts for the construction of the new structures. It is understood that the company is not yet ready to take bids on the machine tool equipment, but it is likely that this matter will be taken up shortly. The additions, which will consist of a machine shop, 150 x 162 ft., blacksmith and testing building, 50 x 90 ft., and store room, 50 x 90 ft., will necessitate the purchase of considerable new machinery.

To increase the capacity of its plant and to extend its trade, the W. Eddy Plow Company, Greenwich, N. Y., has incorporated under the same name, with a capital stock of $100,000. The company has received some large orders for its plows, and to supply the demand will use a portion of the increased capital for installing new machinery of modern type, to bring its plant to the highest efficiency. The company has considered the possibility of making extensive changes to its plant next year, although no definite plans have been formed, and it is thought that new and larger buildings will be erected to take the place of the present plant. The development of electric power from the present water power for running the machinery is also being considered. The officers of the new company are O. H. Eddy, president and general manager; J. W. Wallace, vice-president; W. T. Liddell, treasurer; I. V. H. Gill, secretary; T. A. Eddy, assistant manager, who with H. C. Gray, C. C. Van Kirk, I. C. Blandy, Leroy Thompson, F. W. Eddy and J. R. Skinner constitute the Board of Directors.

The Onondaga Litholite Company, Syracuse, N. Y., is open for bids on one 7½-ton electric traveler, 25 ft. span; sand molding machines, pattern making machines, woodworking machines, planers for planing stone, general foundry equipment, belt conveying machinery, shafting, belting, clutches, and hangers.

J. W. Sisson, Gloversville, N. Y., is ready for bids on the following machinery, to be used in connection with his automobile repair shop: One lathe, one drill press, one milling machine, one motor driven air compressor, and various small machines.

The Perine Machinery Company, 902-908 First avenue, South, Seattle, Wash., is in the market for a machine to face columns, both round and square, 20 in. in diameter and 20 ft. long. The company desires a machine for doing this work without using a lathe.

There are some inquiries in the market for machinery to be installed in the plant of the General Roofing Company, East St. Louis, Ill., whose factory buildings were burned down several months ago. The company at that time had one of the largest roofing paper plants in the country, its production being about 30 tons every 24 hr., and it is understood that the plant was practically destroyed. The company has planned to rebuild on the same scale as before, and this will mean the purchasing of a large amount of power equipment, in addition to the general line of paper machinery.

The Felt Paper Company, Rowlandville, Md., is doubling the size of its plant, and is now buying machinery equipment to install in its addition. The company has been producing about 12 tons of roofing felt a day, and expects with its new equipment to produce 24 tons a day. It now has about 400 hp., and will need power equipment of about the same capacity, in addition to pulp beaters and other paper producing equipment.

Considerable machinery will be required for the Belnord Apartments, to be erected at Broadway and Eighty-sixth streets, New York, which is to be the largest apartment building in the world. The George A. Fuller Company, which has offices on the site of the proposed building, is now letting contracts for equipment, and L. K. Comstock & Co., 50 Church street, have acquired the electrical contract, and now have inquiries out for two 200-kw. units and one 100-kw. unit. The Comstock Company, it is understood, will only do the electrical work, so it is probable that the Fuller Company will be in the market for engines and boilers to match this amount of power equipment. Pumping apparatus and power supplies, as well as electric passenger elevators, freight elevators, &c., will also be required.

Another building that will require considerable machinery is the new Emigrant Bank Building, at 51 Chambers street, for which L. K. Comstock & Co. also have the electrical contract. The inquiries include two 150-kw., one 100-kw. and one 50-kw. unit. There will also be a good sized order in the way of pumps, boilers, &c., for this structure.

Bids will be received until December 10 by the Department of Parks of the City of New York, at its offices in the Arsenal Building, Fifth avenue and Sixty-fourth street, for furnishing seven electric motors for use in the American Museum of Natural History. The amount of security required is $500.

Recent sales by the Hooven-Owen-Rentschler Company, through its New York office at 39 Cortlandt street, include a 400-hp. heavy duty reversing engine, for the Lehigh & Wilkes-Barre Coal Company, for an addition to its power equipment at Wilkes-Barre, Pa.; 300-hp. heavy duty engine,

Miller Fertilizer Company, Baltimore, Md.; 200-hp. engine for an addition which is being made to the plant of the American Paper Company, Bogota, N. J.; 175-hp. engine, W. S. Russell, who is installing a clay refining plant at Mt. Holly Springs, Pa.; 300-hp. belted heavy duty engine, Rochester Box & Lumber Company, Rochester, N. Y., and a 150-hp. engine for an addition to the plant of the Riter Dental Company, Rochester, N. Y.

Chicago Machinery Market.

CHICAGO, ILL., December 1, 1908.

Business for the past week in machine tools has not been noticeably different in character or appreciably greater in volume, than in the preceding weeks of the present month. It is quite evident, however, that in the forward view of things a decidedly hopeful feeling exists. This, to some extent, is based upon inquiries concerning anticipated wants, but is perhaps more generally founded upon an abiding faith in a gradual recuperation of industrial activities. The demand for tools has not thus far broadened into the larger requirements of the more important manufacturing interests, but continues to be characterized by purchases of single tools or small groups by miscellaneous interests. One dealer has on his floor 20 machines tagged for immediate shipment as a result of last week's sales. Most of them were small sizes, but there were included in the number a heavy engine lathe, a radial drill and a planer, the aggregate of all amounting to around $15,000. Among the inquiries in the market, the one of first importance is a list of tools from the Union Pacific Railroad, on which figures are being taken. Besides this, however, there are two or three other small inquiries, each embracing a half dozen or more tools, some of which are for wood working shops. Whether these represent actual orders to be placed at once, or are put out for the purpose of securing data and estimates for making up more extended lists to be submitted later on, is not definitely known. It is understood that work on the shops of the 'Frisco system at Springfield, Mo., has been resumed, but nothing is heard of a renewal of negotiations for the large amount of tools and machinery that will be required to equip this plant. It will be recalled that bids were submitted last year on this equipment, but owing to the development of adverse financial conditions, no orders were placed, and since that time the whole matter has been held in abeyance.

Naturally, trade in machinery lines will follow rather than lead the movement toward general recovery, and for this reason, machinery builders are watching developments in other manufacturing industries with keen interest. While it is true that no phenomenal gains are being made in any direction, and in the most active lines the improvement realized is but moderate, there is nevertheless an undercurrent of strength due to a larger degree of confidence in the outcome that was far less pronounced some months ago.

Growing out of the more prevalent use of automobiles, which is rapidly extending to every part of the country, there is growing up a new demand for machine tools. This is coming from new garages that are being established in cities and towns in an increasing number. In some of these, tools required for extensive repair work, including the rebuilding of cars, are installed, while others are, of course, less fully provided; but there is need of a few tools, at least, in every such establishment. Though individually of small importance, it can readily be seen that the total requirements of the garages of the country will ere long be a factor of no insignificant importance in the machine tool trade.

Machinery Requirements of Union Pacific Railroad.

The following list of machine tools, sent out by J. W. Griffith, purchasing agent, Omaha, Neb., is in the hands of the machine tool trade for figures. The purchase of this equipment has been in contemplation for some time, but the list has only recently been presented to the trade generally:

Three 36-in. heavy pattern upright drills, arranged for geared motor drive; one 21-in. heavy pattern upright drill, geared for motor drive; one sensitive friction disc drill, 10-in. swing, capacity 5-16 in. holes, arranged for motor drive; one 36 in. by 16 ft. head screw cutting engine lathe, motor drive; one 42 x 12 in. variable speed planer, with two rail and two side heads, motor drive; one 2¼ x 7 in. four-spindle automatic turret lathe, motor drive; one power gap shear, 10-in. knives, 18-in. throat, capacity to cut 10 in. by 3-16 in. plate, motor drive; one set, power plate bending rolls, 6 ft. clearance between housings, capacity, to roll ¼-in. plates, 6 ft. wide, to 3 ft. 6 in. radius, motor drive; one 3 x 42 in. double back geared slip roll formers, on iron legs, to roll No. 14 sheet steel; one moulder and carver, complete, with cutters, countershafts and chucks; one 3½-in. vertical power mortising and boring machine, with chisels and augurs ⅜ in. to 1 in.; one 150-ton hydraulic wheel press for wheels 42-in. diameter on tread, complete, with pumps and appliances and motor drive; one vertical single punch, 16-in. throat, capacity, 13-16 in. through ⅝ in., equipped with architectural jaw and cast steel die block and motor drive; one horizontal flange punch, capacity ⅞ in. through ¾ in., with steel stake and offset punch holder, motor drive; one double angle shear, capacity 6 x 6 x ⅝ in. angles, and channels up to 8 in., motor drive; one single punch and shear, 25 in. throat, to be used either as punch or shear, motor drive; one 3¼ x 8 in. automatic turret lathe, motor drive; one No. 4 plain milling machine, power feed, motor drive; two arbor presses No. 5; one 18-in. No. 3 universal brass turret lathe, motor drive; one 16 in. by 8 ft. engine lathe, with quick change gear and feed device, motor drive; one three-spindle boring machine, capacity to bore three cylinders 10-in. bore by 22 in. long with spread of 13 in., motor drive; one cabinet makers' double trim saw bench, capacity to operate saws up to 16-in. diameter, motor drive; one solid universal wood worker, size 8 in., motor drive; one band saw, 42-in. wheels, with iron tilting table, motor drive; one 24-in. surface planing machine; one 20-in. self feed rip saw, motor drive; one No. 2 tenoning machine, motor drive.

A new company with a capital of $50,000 has been organized at Billings, Mont., to construct and operate a machine shop, foundry and vehicle factory. The buildings to be erected include one of one-story, 40 x 130 ft., and one of two stories, 40 x 150 ft. It is expected that the new plant will be built, and its machinery equipment will be secured and installed in time to begin operation about April or May of next year. J. C. O'Donnell of Deadwood, S. D., is at the head of this enterprise.

The Warner Arc Lamp Company, Muncie, Ind., is building a modern reinforced concrete fireproof factory building for the manufacture of its product at Wilton Junction, Iowa. The building is 42 x 200 ft., and its machinery equipment will consist of tools suitable for the manufacture of arc lamps. This factory will be operated as a branch of the company's plant at Muncie.

The Missouri Southern Railroad was in the market last week with an inquiry for a 64 or 70 in. driving wheel lathe for its shops at Leeper, Mo. It was wanted for quick delivery. J. F. Fredericks is superintendent.

The city of Grand Ledge, Mich., has decided to sell the equipment of its municipal electric light plant, consisting of dynamo, transformers, meters, engine, and other apparatus, and will take current for its lighting system from the Commonwealth Light & Power Company, Jackson, Mich. The city will probably install two centrifugal electrically driven, direct connected pumps for furnishing the water supply.

Plans are being prepared by the Tri-City Railway, People's Power & People's Light companies of Rock Island and Moline, Ill., and Davenport, Iowa, for the expenditure of about $500,000 in the betterment of these properties. Of this sum approximately one-half will go into the railroad properties in trackage and overhead work, and the other half will be devoted to gas main extensions and electric equipment. Appropriations covering the work have, however, not yet been made.

The White Bluffs Irrigation Company, White Bluffs, Wash., is preparing to install a 150-hp. producer gas engine for pumping service. The new engine will replace a twin tandem Jacobson engine, which was recently damaged by fire, and will be supplied with gas from a Smith producer.

The boiler equipment for the new La Salle Hotel, Chicago, now under construction, will consist of four 400-hp. units of the Bonson combined tubular and water tube type, built by the Lyons Brothers' Boiler Company, Chicago, which will be equipped with McKenzie chain grate stokers

The Engineers' Society of Milwaukee will meet on the evening of December 9, at the Builders' Club, when E. J. Kearney, secretary-treasurer of the Kearney & Trecker Company, will give a lecture on the construction and use of milling machines, illustrated with stereopticon slides.

Bids will be taken up to December 7 on the machinery equipment required for the new Cook County Court House to be built at Oak Forest, located 20 miles south of Chicago, at a crossing of the Chicago, Rock Island & Pacific Railroad, now known as Dupont. The specifications call for six water tube boilers, equipped with mechanical stokers, coal and ash conveyors, motor driven; one compound general service pump, one horizontal fire pump, one hand pump, one triplex tank pump, and several other small pumps for auxiliary service; a refrigerating system with compressor of 30 tons capacity, four engines, either full Corliss releasing gear type, semi-Corliss nonreleasing gear or for four-valve engines of an aggregate capacity of 1200 hp., three generators of 400-kw., 250-kw. and 150-kw., respectively, together with switchboards and all other supplementary electrical equipment.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 1, 1908.

From present indications the advent of the last month of the year will inaugurate the beginning of a new one commercially; the new life that has been infused into the crude markets showing unmistakably in finished lines, and creat-

ing in tool manufacturing circles a feeling of optimism that has not been in evidence for many months. On the 10th of the month the sentiment of improvement manifest in the tool producing and kindred lines will find expression in what some of the more enthusiastic ones have denominated, in contradistinction to last year's humorously named "poverty" dinner, a "prosperity spread." This is the quarterly meeting and dinner of the Cincinnati Metal Trades Association, to be given at the Business Men's Club, on the date named, and Ohio's Governor-elect Judson Harmon, will head the guest list, with Prof. Frederick C. Hicks of the University of Cincinnati, H. W. Hoyt of the Great Lakes Engineering Works, Detroit, and W. A. Layman of the Wagner Electric Company, St. Louis, as other guests of honor. The invitations that go out to-day will reflect typographically and otherwise the improved conditions and will bear in the honor division the following names, under the head, "Our Presidents": Walter Laidlaw, 1900-1903; William Lodge, 1903-1905; P. G. March, 1905-1907; S. P. Egan; 1907-1908; John W. Neil, 1908. One of the special things that will be discussed and considered at this dinner will be the achievements of the year, and since its promulgation by the local tool men in connection with Dean Schneider of the University of Cincinnati, of the co-operative engineering course. Some figures will be furnished in this connection that will be surprising even to the rank and file of manufacturers, it is said, showing the tremendous success of the idea, and its rapid spread all over the world. Tool manufacturers from all over the country, members of other metal trades associations and of the national organization will be in attendance.

Returns from a wide range of manufacturing territory in this section show that the marked improvement in sentiment is general, and that there are none which find absolutely nothing upon which to base a feeling that a change for the better is imminent. Tool manufacturers in this immediate vicinity all report better inquiries, with an improved outlook in every direction; and some are filling up blank pages in the order book.

One of the best signs to the close observer of conditions in the iron and steel manufacturing trade is the rapidly improving horizon of the steel manufacturer and foundryman. These concerns, particularly the latter, suffered greatly during the year. A number, especially the foundrymen, were shut down much or all of the time. Now something promising seems the portion of every one in this district. The Steel Foundry Company, Cincinnati, which has been idle more than a year, which represents a cost of something like $220,000, and which entered the field at a most inopportune time bids fair to be rehabilitated very soon, and if not reorganized as a steel manufacturing concern, may be converted into a gray iron foundry. Bids to be opened today will be referred to the Insolvency Court for computation and settlement. It is understood that there are two bidders. A syndicate which is bidding has made plans if it secures the property to convert it into a gray iron foundry, and reserve a portion with its machinery, &c., for steel making on a moderate scale if it should be desirable. The total appraisement on the plant was $169,000.

The Lima Locomotive & Machine Works, Lima, Ohio, reports conditions considerably brighter, with more orders for the past 30 days than any month in the past 10. This company is running full time, also night force in some departments.

The American Rolling Mill Company, at Middletown, Ohio, is running on full time, and reports conditions for the past 30 days as good. Its American ingot iron is meeting with popular approval.

The Ohio Machine Tool Company, Kenton, Ohio, reports a slight improvement in business for the month of November. The company has installed a new boiler with increased capacity for power, and has been busy with plans for a new shaper and perfecting standard types.

The Henry Vogt Company, Louisville, Ky., announces business conditions as much improved, and states that it expects to be operating full time beginning December 1.

The American Machine Company, Louisville, Ky., reports business as gradually improving; large contracts are few, although general work has been good, and inquiries the past 30 days have been quite numerous. This company is operating on about 70 per cent. basis.

The Atlas Machine Company, Louisville, reports the elevator business good, with a special run of repair work. The plant is on a 64-hr. per week basis. Replying to a query, the company writes: "Business has been good with us not only the last 30, but for the past 90 days."

The Ironton Malleable Iron Company, Ironton, Oho, expects to start up early in December, with prospects for running full time, according to a report which says: "Business is greatly improved; inquiries are coming in nicely."

The Belfonte Iron Works Company, Ironton, Ohio, reports conditions for the past 30 days as very good. This company has recently installed two new engines, two new hammers, a galvanizing plant for nails, and has made extensive repairs in its plant.

Optimistic reports come from the mills of the West Virginia Rail Company, at Huntington, which is owned by Columbus capital. It is stated that the plant is being operated to its full capacity, and on double turn. The company converts standard rails by rerolling into light steel rails for which the demand is steadily increasing.

The Defiance Machine Works, Defiance, Ohio, which enjoys the distinction of being one of the pioneers in the woodworking machinery manufacturing class, and will within a year or so celebrate its sixtieth anniversary, has announced the inauguration of a steady six-day schedule.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 1, 1908.

Business with machinery houses and machine tool builders is gradually improving. While large inquiries are scarce most of the dealers report a fair volume of orders during the past week, and the outlook good for the balance of the year. New inquiries are quite plentiful. The demand is coming from about every kind of manufacturing establishment that uses machine tools. A large percentage of manufacturing plants has installed practically no new machinery during the past 12 months, orders for new equipment, except what was absolutely necessary, having been held up until general conditions had improved. With the encouraging business outlook, manufacturers feel warranted now in being prepared for the future by adding to the capacity of their plants, and making them more efficient by the installation of up-to-date tools. Inquiries for machinery that were in the market in the fall of 1907 are being revived, and will soon result in the placing of some business. The demand for milling machines seems to be better at present than for any other kind of machine tools. There is considerable improvement in the demand for cranes for industrial plants. The second-hand machine tool market is fairly active. Some used tools are being placed in the hands of dealers by manufacturers who are installing more modern equipment but the available supply is not large.

Inquiries for heavy handling machinery for mining operations and other purposes are more plentiful, and some inquiries are beginning to come from the railroads for machinery of this character. Builders of industrial cars report a gradual improvement in orders and inquiries.

The general manufacturing situation continues to improve slowly in most lines, and nearly all plants are being operated with a larger force of men or on longer hours than a month ago. Automobile plants are about all working near their full capacity on their 1908 output, and makers of automobile parts have a good volume of work on hand.

While the jobbing foundry situation is not yet satisfactory, it has improved somewhat.

Machinery builders and dealers in Cleveland have received a large volume of orders during the past two months from automobile plants in Detroit and other points in Michigan. Nearly all of the Michigan automobile builders are preparing to increase their output during the coming season by the erection of additions or the purchase of additional machinery. In addition to other building operations by some of the large Michigan automobile interests which have previously been mentioned, the following are noted: The Reliance Motor Truck Company, now in Detroit, is building a large plant in Owosso. The Motor Car Company, formerly in Detroit, has been reorganized with a large increase in capitalization under the name of the Carter Car Company, and has moved its plant to Pontiac. The Rapids Motor Vehicle Company has added a large addition to its plant in Pontiac.

The American Steel & Wire Company has a number of inquiries out for machinery equipment for several of its plants, for which the company expects to make purchases soon after the first of the year. The last inquiry of the company during the past few days is for two turret lathes, two radial drills, two 20-in. lathes and one 42-in. lathe.

The McMyler Mfg. Cmpany, Cleveland, builder of car dumpers, locomotive cranes, buckets, &c., reports an improvement in orders and considerable increase in inquiries, some of which are now coming from the railroads. The past week the company took an order for a 20-ton locomotive crane for delivery in Detroit. The company has been able to add considerably to its working force during the past few weeks.

J. O. Brown has been given an option on the plant of the Brown-Cochran Company, Lorain, Ohio, manufacturer of gas engines and refrigerating machinery. The option is for $125,000, and includes the plant and equipment. The option has been approved by the creditors of the company. Mr. Brown is now engaged in financing the deal, and hopes to be able to take the plant over and have it in operation by December 15. The reorganized company will probably be known as the Brown Engine & Mfg. Company.

Hill, Clarke & Co., Inc., have leased an adjoining room, doubling the floor space of their Cleveland sales and demonstration room at 711 St. Clair avenue. The Cleveland

office is now carrying a line of second-hand, as well as new, tools.

L. H. Mesker, who has been representing a Cleveland machinery houses in Cincinnati, became connected on December 1 with the Cleveland office of Manning, Maxwell & Moore, Inc.

The Ohio Ceramic Engineering Company, Cleveland, reports considerable improvement in the industrial outlook. Inquiries for industrial cars and other products of the company have become quite plentiful, and the actual orders on hand have enabled the company to materially increase its working force.

A new company is being formed which it is expected will soon take over the property of the D. D. Flanner Company, Toledo, Ohio, manufacturer of water tube boilers, which has been operated by W. F. McGuire as receiver since last May. A number of prominent business men will probably be interested in the concern.

The Twentieth Century Pipe Wrench Company, Lancaster, Ohio, has been incorporated with a capitalization of $25,000 by G. M. Gealy, James Henderson, F. P. Barr, J. C. Dallow and L. G. Sillbaugh.

The Doe Battery & Mfg. Company, recently organized in Kent, Ohio, for the manufacture of a new dry battery, is now installing its machinery equipment in a plant in that place. The company has taken out incorporation papers with a capitalization of $100,000. Officers have been elected as follows: John F. Babcock, president; Walter S. Doe, vice-president; Frank D. Pitkin, secretary and treasurer.

The J. D. Smith Foundry Supply Company, Cleveland, reports a satisfactory increase in orders and inquiries for foundry supplies and equipment.

Owing to the increase in its business, the Safety Door Hanger Company, Ashland, Ohio, has been compelled to provide a larger plant, and has commenced the erection of an addition that will greatly increase the present capacity.

The Service Pump Company, which was recently formed in Canton, Ohio, has increased its capitalization from $25,000 to $125,000.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 1, 1908.

While it is too early to obtain actual data regarding the volume of business transacted by local machinery manufacturers and merchants in the month of November, what information there is obtainable would indicate that it exceeded the previous month materially. Dealers particularly report improved sales, mostly confined to small propositions, but there is no doubt that considerable business has been released since the election. Stocks in merchants' warehouses and on display floors are approaching more normal conditions, and in some few cases orders have gone forward to manufacturers to replenish the decreased stocks in dealers' hands. There has not been enough business of this character to absorb all the stocks which have accumulated in builders' warerooms during the year, and it will require considerably more buying to reduce them to the point where an increase in the present production will be necessary. This applies particularly to standard tools, but in the special lines manufacturers report a somewhat larger volume of business, which from its nature means an almost immediate increase in production, but even in this class of work there has not yet developed enough business to bring the production up to anything like normal.

The trade is much encouraged with the outlook, as the volume of business pending is large, although no extensive buying is expected to come out during the month of December, as it is customarily a dull month, and with the closing of the year's business buying usually subsides, to open up again more actively about the middle of January. Railroad buying has not improved to any extent, and little business is expected from this source until after the turn of the year. Industrial plants are taking a somewhat better volume of business; the shipyards have recently booked further orders, and more business is pending, but it will require time until the new orders reach the point where they will be of material benefit to the machine tool trade.

There has been practically no change in the foreign demand. Little business has developed in the standard lines of tools, although there have been some scattered orders for special equipment. Manufacturers who have an established trade abroad in power transmission specialties report practically unchanged conditions, orders being fair, but small in size.

Second-hand machinery dealers continue to transact a fairly satisfactory volume of business. Sales are somewhat irregular, but in the aggregate show a pretty good total. The demand has been confined to no particular class of tools, but those of the better class and modern types find the most ready sale. Several of the local merchants, who do not regularly handle second-hand tools, but who have recently purchased equipment of this character, report a ready sale in such second-hand tools, and in one or two instances have pretty well cleaned up their stocks. The boiler and engine trade moves rather slowly, with some scattered buying of moderate size equipment, both new and second hand. Several propositions requiring power equipment of the larger size are before the trade.

A trifle more activity is to be noted in the foundry trade. The steel and malleable foundries have been helped to some extent by railroad business, developing largely from increased repair work on the part of the railroads as well as from car builders and shipyards. The gray iron foundries have also shown a somewhat greater output, and while they have been benefited to some little extent by orders for machinery castings, the bulk of the business has been of a more general character.

The Screw Cutting Company of America, now located at Wayne Junction, will erect a new plant from plans by Milton B. Medary, Jr., at Seventeenth street and Sedgely avenue, Philadelphia. The structure will be of brick 60 x 90 ft., two story front and one story back building. Some little equipment has already been purchased for the new plant, but more in the way of general equipment will be required as soon as it is completed. A number of special screw cutting machines are now being built for the company, but the nature of the power plant to be installed has not yet been decided.

The American Ice Company has decided to go ahead with the erection of its proposed new plant at Glenwood street and Montgomery avenue, Philadelphia. This will be one of the largest ice manufacturing plants in this city, the plans including a freezing building 60 x 170 ft., an ice storage building 60 x 120 ft., a distributing house 43 x 69 ft., and a power house 51 x 130 ft. All the buildings are to be of the slow burning construction type.

The Gregg Carriage Company, northeast corner of Twelfth and Arch streets, has had plans prepared by Henry E. De Hoff, architect and engineer, for a four-story brick and terra cotta factory building and display room at 1926-32 Arch street. The building is to be 52 x 120 ft., four stories.

The Department of Public Works, Bureau of Supplies, will receive proposals for bridge work, including ornamental lamp posts, interior fittings, for the Spring Garden Laboratory, and branch sewer work, until noon, December 8. Specifications may be obtained upon application to the Chief Engineer, Room 416, City Hall.

The Standard Pressed Steel Company reports business to have shown a slow but steady gain during the month of November. The domestic demand for wrought steel shaft hangers has shown a better improvement than has the foreign demand, and a very fair volume of business has developed from customers in this country. The export trade continues on about an even basis, the bulk of the recent orders coming from Continental Europe and the far East. Orders on the whole are more numerous, and show a slight improvement in size, individually.

The Becker, Smith & Page Company, Water street, Snyder avenue and Swanson street, will make additions to its plant which will double its present capacity. Plans are being prepared by Ballenger & Perrot, engineers, for a three story brick addition of slow burning construction, 84 x 306 ft.; a four-story reinforced concrete building, 48 x 50 ft.; a one-story power house, and a third story addition to its present two-story building. Estimates for the building work are now being taken by the engineers.

New England Machinery Market.

BOSTON, MASS., December 1, 1908.

Some condition which the trade is unable to understand is holding back the market for machine tools, there having been little of the expected quick response to the settlement of the national election. Orders booked for the past week are not so numerous nor so formidable in money totals as they were just previous to the election. The month of November as a whole has not been entirely unsatisfactory, everything considered, but the market at the present time has little life. The general impression is that the usual holiday let-up has arrived, having as an important factor the desire of those concerns that are taking inventory previous to the closing of their fiscal years, or the issuing of semi-annual statements, to make as good a showing as possible under the adverse conditions which have confronted them during 1908. Some good judges, however, believe that the remainder of the year will show a more pronounced improvement, while it is the opinion of others that the new year will have passed before any material change is noted. All agree that conditions among customers, as evidenced by their inquiries and comments, are such as to indicate the beginning of another era of great prosperity before next year has ceased to be young. While the standard lines of machine tools have not felt more than a mild improvement, certain more special classes of machines are doing much

better, a notable example of this being the shops of Connecticut which supply manufactures of hardware and other special products, and the brass industry of the Naugatuck Valley. Builders of mining machinery report an increase in interest on the part of their customers, with but few orders.

The machine tool builders are beginning to receive stock orders, made necessary partly by the depletion of stocks due to recent increase in sales by dealers who have done no buying excepting on orders for customers for a long time, and partly by the anticipation of a better business in the not far distant future. There is a gradual lengthening of working hours in the shops, and men are being taken back, though in the majority of cases very gradually.

The dealers in steel report that their customers are closing contracts for next year's supplies, but are placing few specifications against those contracts. The tendency in the trade is to provide for a considerable tonnage in anticipation of a good business in 1909, under the usual system of maximum and minimum limits. The trade has been rather lenient to its customers during the depression, not always insisting upon the fulfilment of the contract where the minimum amount named was in excess of the steel required in business. It is not feared that any concessions of the sort will be necessary under next year's contract, because of the promise of improved demand as indicated by the iron and steel market.

The works of the Becker Milling Machine Company, Hyde Park, Mass., have gone on full time, and are approaching a normal working force.

In connection with proceedings in the United States Circuit Court at Trenton, N. J., concerning the receivership of the Electric Vehicle Company, Hartford, Conn., it was brought out that considerable headway has been made in carrying out a plan of reorganization on the part of the bondholders and secured creditors. If the project works out the future of the concern as a going industry is assured. The court has granted the receivers the right to continue operating the shop until July 1, 1909, an extension of six months.

The Navy Department's estimates for improvements to navy yards include additional crane service for the Charlestown Navy Yard, and a more extensive list for the Portsmouth Yard, including something like $100,000 for equipment of the new boiler shop, an extension of the machine shop, a pattern shop, and other buildings which, if erected, will require the purchase of large amounts of machine equipment.

The business of Boynton & Plummer, Worcester, Mass., manufacturers of blacksmiths' tools, has been purchased by William H. Wilder, Gardner, Mass., of the Central Oil & Gas Stove Company of that town. It is Mr. Wilder's intention to organize a corporation in the near future to take over the Boynton & Plummer business. It will remain in Worcester, at the present shop, on Hermon street, and will be conducted along the same general lines as formerly as regards its product. It is an old established business.

Additional contemplated enlargements reported from the textile mills include a large plant for the Sagamore Mfg. Company, Fall River, Mass. The company proposes to issue $300,000 of new stock, the proceeds of which, together with a surplus of about equal amount, will be expended for the new mill. The land is already available. The Hartford Carpet Corporation, Thompsonville, Conn., will build a new mill, 110 x 270 ft., and three stories.

The Brown Cotton Gin Company, New London, Conn., manufacturer of cotton ginning machinery and general machine shop and foundry products, has begun the manufacture of automobiles, having taken a contract from the Cameron Automobile Company, Beverly, Mass., for 300 complete cars. The entire work will be done in the Brown shops, including machinery and trimmings. The shop equipment is such that little new machinery will be required.

The Westmacott Gas Furnace Company, Providence, R. I., manufacturer of gas blast furnaces, will move its factory to the plant of the Builders Iron Foundry, 9 Codding street. A downtown office will be established at 68 Clifford street, in the heart of the manufacturing district of the city and easy of access. W. C. Buell is the president and treasurer of the company; A. I. Westmacott, vice-president, and W. C. Buell, Jr., secretary and general manager.

It is stated in Middletown, Conn., that the Parker Machine Company, Buffalo, N. Y., is negotiating for the plant of the Eisenhuth Horseless Vehicle Company, with a view of establishing the Parker business in Middletown. If the plan goes through, a new typewriting machine will be manufactured there.

The New England railroads are preparing enlarged facilities for taking care of a growing traffic, which promises to pass all records with returning industrial and commercial prosperity. The Boston & Albany Division of the New York Central is to make important changes at its West Springfield yards, involving the expenditure of $1,000,000, and including a new roundhouse of 21 stalls, and an annex building, 110 ft. square. Facilities in the way of cranes and tools will be provided to take care of what are known as round house repairs in distinction from repair shop work. There will be a boiler house containing five boilers, and an oil house. In addition, a mechanical coaling plant will be installed, the contract for which has been let to Fairbanks, Morse & Co., Chicago. The apparatus will have a capacity of elevating 2400 tons in 24 hours. The Boston & Maine Railroad is spending about $3,000,000 for new locomotives and cars, contracts for which were placed some time ago, as mentioned. The addition of this rolling stock will make still more imperative the building of the new repair shops, a project which has been under way a long time. It is believed that the control of the system by the New York, New Haven & Hartford Railroad has brought the fulfilment of the great works close at hand, though the engineers of the system have no knowledge of any immediate steps in that direction, it is stated. The new equipment includes 1000 box cars, 1000 drop end cars, 40 locomotives, and some passenger and combination coaches.

The Sanitary & Specialty Company, South Norwalk, Conn., has established a shop on Water street for the manufacture of plumbing specialties. The owner of the business is J. B. Burr, formerly of the Burr Mfg. & Supply Company, Brooklyn, N. Y.

The Stockbridge Machine Company, Worcester, Mass., manufacturer of shapers, returned to a full time basis Monday.

The Oxy-Carbi Company, New Haven, Conn., has begun the manufacture of a new type of apparatus for the autogenous welding and cutting of metals by the oxy-acetylene process. Both stationary and portable plants will be included in the product.

Government Purchases.

WASHINGTON, D. C., December 1, 1908.

The estimates submitted by the Chief of the Bureau of Yards and Docks for improvements for the various navy yards the coming year include naval station, Guantanamo, Cuba, dry dock to cost $2,500,000, $400,000; Portsmouth Navy Yard, foundry to cost $250,000, $50,000; Philadelphia Navy Yard, power plant extension, $172,000, crane runways and cranes, $13,900; naval station, Pearl Harbor, Hawaii, dry dock to cost $2,000,000, $200,000; machine shops to cost $300,000, $200,000; Norfolk Navy Yard, electric plant extensions, $20,000, locomotive crane, $50,000; New York Navy Yard, central power plant, $116,000; Mare Island Navy Yard, central power plant, $255,000, locomotive crane, $55,000; Boston Navy Yard, power plant extension, $145,000; Puget Sound Navy Yard, pattern shop, $40,000.

The Isthmian Canal Commission will receive bids until December 21, Circular No. 482, for marine boilers, pipe cutters and other supplies.

Bids will be received until December 21 at the office of the Engineer, United States Army, New Orleans, La., for ice machine and refrigerating and distilling plant in the machine shop building at Burrwood, La.

The Isthmian Canal Commission will soon ask bids for a quantity of journal and ball bearing jacks.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 22 for one tool and cutter grinder, two grinding and shaping machines, four milling machines, and until December 29 for one locomotive crane, drills, cutters, &c.

The following bids were opened November 24 for machinery for the navy yards:

Class 1, one vertical automatic steam engine—Bidder 46, D'Olier Engineering Company, Philadelphia, Pa., $305; 68, A. D. Granger Company, New York, $260; 76, Harron, Ricard & McCone, San Francisco, Cal., $280.80; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $206 and $296; 132, Ohmen Engineering Works, San Francisco, Cal., $395; 135, Pacific Tool & Supply Company, San Francisco, Cal., $395; 163, Sheppard Engineering Company, Waynesboro, Pa., $342.50.

Class 2, one patent head engine lathe—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $962; 76, Harron, Ricard & McCone, San Francisco, Cal., $957.30; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $857 and $954; 135, Pacific Tool & Supply Company, San Francisco, Cal., $1050.

Class 3, one sliding upright drilling machine—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $400; 62, Frevert Machinery Company, New York, $334; 74, Handlan, Buck Mfg. Company, St. Louis, Mo., $410.50; 76, Harron, Ricard & McCone, San Francisco, Cal., $376.70; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $378; 126, Niles-Bement-Pond Company, New York, $380; 135, Pacific Tool & Supply Company, San Francisco, Cal., $325.

Class 4, one crank shaping machine—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $767; 57, Ecles & Smith, San Francisco, Cal., $666; 74, Handlan, Buck Mfg. Company, St. Louis, Mo., $626 and $662; 76, Harron, Ricard & McCone, San Francisco, Cal., $565.80; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $568 and $687; 135, Pacific Tool & Supply Company, San Francisco, Cal., $725.

Class 5, one grinder head—Bidder 62, Frevert Machinery Company, New York, $98; 76, Harron, Ricard & McCone, San Francisco, Cal., $99.65; 135, Pacific Tool & Supply Company, San Francisco, Cal., $90.

Class 11, one engine lathe—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $1275; 76, Harron, Ricard & McCone, San Francisco, Cal., $1273.83, $1314.33 and $1279.63; 88, Hamilton Machine Tool Company, Hamilton, Ohio, $1220; 103, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $1132.82; 116, Manning, Maxwell & Moore, New York, $1345; 155, Springfield Machine Tool Company, Springfield, Ohio, $1158.

Class 12, one 14-in. engine lathe—Bidder 31, Compressed

Air Machinery Company, San Francisco, Cal., $1145; 76, Harron, Ricard & McCone, San Francisco, Cal., $1063.65, $1100, $1017.35 and $1086.65; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $1070; 88, Hamilton Machine Tool Company, Hamilton, Ohio, $1018; 103, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $952.55; 135, Pacific Tool & Supply Company, San Francisco, Cal., $1150; 137, Pratt & Whitney Company, Hartford, Conn., $1509; 155, Springfield Machine Tool Company, Springfield, Ohio, $987.

Class 13, one 14-in. engine lathe—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $1095; 76, Harron, Ricard & McCone, San Francisco, Cal., $951.20, $988.38, $904.90, $974.20; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $955; 88, Hamilton Machine Tool Company, Hamilton, Ohio, $846; 103, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $824.54; 135, Pacific Tool & Supply Company, San Francisco, Cal., $1025; 137, Pratt & Whitney Company, Hartford, Conn., $1309; 155, Springfield Machine Tool Company, Springfield, Ohio, $857.

Class 14, one 18-in. engine lathe—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $1431; 76, Harron, Ricard & McCone, San Francisco, Cal., $2545.45, $2636.15 and $2576.45; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $2446, $2655, $2346 and $2555; 88, Hamilton Machine Tool Company, Hamilton, Ohio, $2356; 103, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $2272; 116, Manning, Maxwell & Moore, New York, $3270; 135, Pacific Tool & Supply Company, San Francisco, Cal., $2745; 155, Springfield Machine Tool Company, Springfield, Ohio, $2305.

Class 15, two 20-in. engine lathes—Bidder 31, Compressed Air Machinery Company, San Francisco, Cal., $1624; 76, Harron, Ricard & McCone, San Francisco, Cal., $1537.26, $1446.66 and $1380.61; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $1442, $1652, $1392 and $1592; 88, Hamilton Machine Tool Company, Hamilton, Ohio, $1770; 103, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $1397.95; 116, Manning, Maxwell & Moore, New York, $2300; 135, Pacific Tool & Supply Company, San Francisco, Cal., $1725; 155, Springfield Machine Tool Company, Springfield, Ohio, $1335.

Class 16, one No. 3 Pratt & Whitney die sinking machine—Bidder 137, Pratt & Whitney Company, Hartford, Conn., $1203.

Class 17, one hydraulic beam bending press—Bidder 78, Henshaw, Bulkley & Co., San Francisco, Cal., $850; 165, William Sellers Company, Philadelphia, Pa., $1235; 199, Camden Iron Works, Camden, N. J., $890.

Class 18, one file sharpening machine—Bidder 2, American File Sharpener Company, New York, $375; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $385; 96, Jandus Electric Company, Cleveland, Ohio, $298.

Class 19, one tempering and one hardening furnace—Bidder 76, Harron, Ricard & McCone, San Francisco, Cal., $1479; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $1485; 102, Kenworthy Engineering Company, Waterbury, Conn., 1865; 107, Merck Fuel Oil Equipment Company, Norfolk, Va., $1988.

Class 21, one lightning pole and manhole punch—Bidder 26, Camden Iron Works, Camden, N. J., $2480; 41, Cleveland Punch & Shear Works, Cleveland, Ohio, $5765; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $2245 and $2340; 109, Morgan Engineering Company, Alliance, Ohio, $3460; 116, Manning, Maxwell & Moore, New York, $4850.

Class 31, one power facing press—Bidder 76, Harron, Ricard & McCone, San Francisco, Cal., $405; 78, Henshaw, Bulkley & Co., San Francisco, Cal., $155; 135, Pacific Tool & Supply Company, San Francisco, Cal., $375; 203, Drew Machinery Agency, Manchester, N. H., $675.

Class 51, one universal tool grinding and sharpening machine—Bidder 165, William Sellers Company, Philadelphia, Pa., $1000; 172, Tabor Mfg. Company, Philadelphia, Pa., $1013.75.

Class 61, six Pratt & Whitney engine lathes—Bidder 62, Frevert Machinery Company, New York, $730; 85, Hendey Machine Company, Torrington, Conn., $915; 116, Manning, Maxwell & Moore, New York, $915; 137, Pratt & Whitney Company, Hartford, Conn., $869.

Class 62, two engine lathes—Bidder 85, Hendey Machine Company, Torrington, Conn., $1130; 116, Manning, Maxwell & Moore, New York, $1130; 137, Pratt & Whitney Company, Hartford, Conn., $1472.

Class 71, one motor driven triplex hydraulic accumulator pump—Bidder 47, Deane Steam Pump Company, New York, $9321; 79, T. H. Hayes Machinery Company, Boston, Mass., $10,750, $10,350 and $10,075; 184, Watson-Stillman Company, New York, $6300.

Class 135, two motor generator sets—Bidder 63, General Electric Company, Schenectady, N. Y., $3686.50; 118, McCay Engineering Company, Baltimore, Md., $3773.50; 195, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $3844.50.

Class 144, two motor driven centrifugal pumps—Bidder 9, Baldwin & Baldwin Company, New York, $1180; 45, Dravo, Doyle & Co., Philadelphia, Pa., $1050; 46, D'Olier Engineering Company, Philadelphia, Pa., $1265; 116, Manning, Maxwell & Moore, New York, $1295; 127, National Electrical Supply Company, Washington, D. C., $1500; 131, J. Edward Ogden, New York, $1220.79; 194, Watson-Stillman Company, New York, $925.

The following bids were opened on November 21 for air compressors with accessories for the navy yards, Boston and Mare Island:

Item 1, Price for two air compressors complete with equipment and accessories. 2, Work complete with bidder's modification of methods and details.

Nordberg Mfg. Company, Milwaukee, Wis., item 1, $58,260; 2, $50,000.

Chicago Pneumatic Tool Company, Chicago, Ill., item 1, $63,500.

Providence Engineering Works, Providence, R. I., item 1, $52,900.

Ingersoll-Rand Company, New York, $59,071.

Laidlaw-Dunn-Gordon Company, New York, item 1, $50,892.

The Electro Metallurgical Company, 79 Wall street, New York, has issued a small pamphlet quoting the opinions of a number of firms of patent lawyers on a series of patents relating to ferrosilicon, owned by the company. Conspicuous among them are those taken out by Dr. G. De Chalmot when connected with the electrometallurgical plant of the Willson Aluminum Company at Leaksville, N. C. They are dated April 26, 1898; April 26, 1898, and September 7, 1897, which it is claimed control the manufacture and sale of high-grade ferrosilicon as produced in the electric furnace, being both product and process patents.

Prayer for the Zinc Ore Duty.

BY FITZ NIGEL.

JOPLIN, Mo., November 26.—Prayers that Congress will be moved in the proposed revision of the tariff to increase the duty on zinc ore were offered to-day in their Thanksgiving petitions by the ministers of all the churches here, in the 25 towns in Jasper County and throughout the Kansas-Missouri mining district.

To-day, good Lord, we give Thee thanks
For melons cut, with more to come,
And other fruit from native trees,
The fat and juicy tariff plum.
And now we humbly ask Thine aid
To raise the tax on zinc,
Because our infant trade now stands
Close on to ruin's brink.
We know the prayer of righteous men
With Thee availeth much,
And with all modesty we say
That we are really "such."

Oft times, good Lord, you give good gifts
Before of Thee we ask,
Therefore with Thee just now to plead
Would seem ungrateful task.
But, Lord, we're in deep water now,
Please help us ere we sink,
And raise the tariff, gracious Lord,
And raise it high, on zinc.

We do not ask Thee mountains move
And cast into the sea,
To help the poor, to heal the sick,
And cause the blind to see.
For things like these we have no use,
We need substantial "chink."
We must have help, and have it now,
Good Lord, remember zinc.

Although Thou'rt asked by selfish men
To make our metal free,
If Thou art for us, gracious Lord,
Who can against us be?
And if Thou'lt grant our fervent prayer
We'll scatter Bibles 'round,
Will homes and schools and churches build
And foreign missions found;
Will pray that free trade men repent,
That scoffers Thee will praise,
If Thou wilt help us in distress
And tax on zinc will raise.
We know 'twill raise the price of paint,
Of mats and tub and sink;
But other people pay the bill;
Good Lord, protect our zinc.

When Congress meets, and Uncle Jo
Appoints committees there,
Good Lord, direct their minds and hearts
To give us extra share.
If they revise the list on iron,
And copper, tin and lead,
So that the workingman can have
More cash for meat and bread,
We'll not object to acts like that,
In fact, we'll slyly wink,
If they'll but help our infant trade
And raise the tax on zinc.

When we shall reach the heavenly land
And view its shining shore,
Its pearly gates and golden throne,
As told in Bible lore,
And hear the music of the spheres
And sweet angelic choir,
With cherubim and seraphim,
With trumpet, harp and lyre—
Good Lord, we shall not be surprised,
Because we really think
We'll find the streets and alleys there
All paved with Western zinc.

M. A. Hanna & Co., Cleveland, Ohio, have closed the purchase of the 52 acres of land with 3000 ft. of frontage on the Niagara River just north of Buffalo, upon which they held contract of sale, and it is expected that construction work on two blast furnaces will be commenced early the coming year. Test holes are now being sunk to determine the distance to bedrock, upon which the foundations of the furnaces will be built, estimated to be about 40 ft. below the surface.

HARDWARE

ONE of the disadvantages connected with the existence of strong Hardware associations is that the merchant is apt to rely upon his association to look after the interests of the trade, and he thus neglects to put forth individual effort for his own protection and the advancement of trade interests. If in convention assembled an organization passes a resolution expressive of the judgment of the trade on a certain measure the merchants are likely to look upon that subject as covered, and to consider that they have nothing to do in the premises. The fact is that resolutions of this character have proportionately less weight than would the expression of the individual opinions of the members. Resolutions are at best somewhat formal and impersonal, and it is well known that they are often passed in a perfunctory manner without mature consideration. They lack the personal note; they have not the direct and forcible appeal of an individual expression. A resolution passed by an association very frequently of unknown strength and perhaps but inadequately representing the interests with which it is identified, is very easily pigeonholed or waste-basketed by the official to whom it is sent. A personal letter or a united protest from the merchants of a country village with their signatures, will in most cases make a deeper impression on the recipient than would the impersonal resolution of an organization, representing perhaps ten or one hundred times as many merchants. The danger, however, is that the individual merchants will excuse themselves on the ground that their association has acted on the subject and that their attitude is thus formally and officially declared. This is a disadvantage and a peril, perhaps inseparably connected with association activity. It is sometimes a brake on personal initiative and effort. It keeps merchants from doing things which it is up to them to do and which without the association they would do.

All this has immediate application to the merchandise parcel post problem. Every Hardware organization, we believe, has put itself on record in opposition to the project. These organizations include the National Hardware Association, representing nearly all of the largest jobbing houses; the American Hardware Manufacturers' Association, representing manufacturers, the vastness of whose interests is indicated by the fact that their invested capital is more than a thousand millions; the National Retail Hardware Association, which is a delegated body representing the various associations of about two-thirds of the State, all of which in formal convention have taken similar action, disapproving of the merchandise post project in any form as contrary to public policy and sure to be injurious to the merchants of the country. While these resolutions have undoubtedly had weight with the legislators to whom they have been sent, it is safe to say that their full significance as expressions of the judgment of the trade has not been appreciated. Meanwhile, some letters have gone from business men to their Senators and Representatives in Congress, and these letters very likely had more influence than the formal utterances of the conventions, above referred to. The trouble has been that so few such personal advices have been sent to the lawmakers. The individual merchants in most cases did nothing. Having voted for the resolution they have since been silent, so far as the making of a protest against the legislation in question is concerned. It is time that a different course be pursued. Merchants must speak out and let their attitude on the governmental carriage of merchandise in the mails be known.

The special danger at this time is in connection with the establishment in a nominally experimental way of a merchandise post over the rural routes. Against this insidious measure there should be a prompt protest from every branch of trade. Petitions in opposition to it should be circulated among all the merchants in every town and village. A good example of what may be done in this direction is given in another column, where we reproduce a petition from the merchants of a thriving Wisconsin city in which grocers, druggists, Hardwaremen, dry goods merchants, tailors, jewelers, real estate and insurance agents, and dealers in other lines unite in condemning the establishment of a parcel post on the rural routes or at large as a menace to their interests. This petition, which was gotten up by the able and energetic secretary of the State Association, at the suggestion of the editorial in the last issue of *The Iron Age*, will serve as a model for similar activity on the part of merchants in every section of the country. Such petitions if sent to the Congressman of the district cannot fail to have great influence.

The plausible argument of the Postmaster-General that a merchandise parcel post on the rural routes would help the local merchants must be distinctly met by bringing out emphatically these facts:

That local merchants do not regard this rural parcel post with favor;

That they deem it hostile to their interests;

That it would diminish instead of increasing their present facilities,

AND THAT THEY DO NOT WANT IT.

HARDWARE merchants in some sections are profiting largely at present from business developing through the picture puzzle fad. Jig Saws for the manufacture of the puzzles are being sold by the hundreds in some of the larger centers, and in corresponding volume in smaller places. A picture is glued to a thin sheet of wood, and the Saw cuts it into small pieces of constantly varying shapes, the puzzle being to put them together again. Recourse is had to the Hardware merchant for the Jig Sawing Machine, the Saw Blades and the wood. One Boston house has sold 150 machines in a little more than a month, and the demand continues unabated. It is not difficult to see how this fad will naturally evolve into others where the thin bladed Saw will be required in shaping wood. A generation ago the Jig Saw had a great vogue for the manufacture of what was generally called fret saw work, consisting of brackets, book shelves and the like. The merchants of the day disposed of great quantities of wood of suitable varieties, and machines and Saws constituted a somewhat important item of trade. Many men in middle life to-day remember their enthusiasm for the work. Their children have sought out the old machines from garret and storeroom, and are using them in the gratification of the new fad for the picture puzzle. But most enthusiasts must buy new machines. Women as well as men are doing the work, and some of them are making money from it, for they

find a ready market for well made puzzles, the retail price of which is 1 cent per individual piece, and some puzzles contain hundreds of the little sections.

Another fad which seems to be equally fascinating is that of making metallic lampshades. They are fashioned from thin sheet brass or copper, the designs being worked out in little holes pricked through the metal with a long, fine pointed awl. The decorative effect is effectively brought out when the light of the illuminant shines through. The completed shade is often fringed with beading and suspended by fine jack chain. The demand for the required materials is very large in those places where the fad has obtained a foothold. One merchant has placed orders within a fortnight for 350 dozen of the chain, and sales keep pace with the supply. His purchases of sheet metal, awls, beading, patterns and other accessories are correspondingly large.

The foregoing instances are cited merely to illustrate special or temporary avenues of activity, which may be followed with profit by many Hardware merchants. Such fads come under the general head of arts and crafts, in which amateur workmen and workwomen amuse and often assist themselves financially by the fashioning of articles useful or artistic, generally both. Philanthropic persons often make use of such means in helping deserving people, who would be hurt by an offer of charity undisguised. The work requires tools and materials for which the Hardware store is perhaps the most natural source of supply. The merchant who cultivates this field of profit will not only reap direct benefit, but will attract to his store customers who will return for other classes of purchases. He will make friends. Where fads have not been established in his community he has the opportunity to encourage them by advertising and window display. They come and go, but there is always something that is fashionable, requiring the labor of those who would indulge in it and necessitating the purchase of tools and materials. Interest can be stimulated by the merchant. No doubt a record of customers for one fad would bring happy results when circularizing for another, for the faddist is apt to drift from one hobby to another, entering into each with enthusiasm and diligence.

Condition of Trade.

The trade while taking a cheerful view of the prospects for next year, are well occupied in taking care of present business. The coming of winter and the approach of the holidays has a stimulating effect on the minor movement of seasonable goods and of articles which are made prominent in the business which develops about Christmas and New Year's. The better tone which has gradually been coming over the market, as the unsettled conditions of a year ago are being left farther behind and commercial and financial matters are righting themselves, is inspiring confidence and causing a more liberal purchasing of goods. At the same time the approach of inventory is not lost sight of, and this annual task, accompanied as it is with a searching analysis of the success of the year's efforts, tends to curtail purchases for the time being. The fact that the tariff is sure to be discussed and probably revised, possibly on more radical lines than many anticipated even a few weeks ago, will doubtless have some influence on business—how much remains to be seen. For these and other reasons the demand for Hardware and related lines, although fairly good under the circumstances, is with some manufacturers at least not as active as a few weeks ago, while the prospect for next year's business is promising. Prices remain without substantial change, there being, however, some revisions of quotations and shadings here and there, with occasional minor advances. On the whole the market is a steady one and radical changes in quotation are not expected in the near future. Reports from local merchants throughout the country are generally encouraging and many of them are doing a good business, especially those who are in the agricultural sections where labor is well employed and the people generally prosperous.

Chicago.

While presenting no new features of significant interest, either in the development of business or in the trend of prices, the Hardware market continues fairly active, considering the season and surrounding circumstances. As the end of the year draws near and the time for taking inventories of stock approaches, both retailers and jobbers are naturally gauging and limiting their incoming shipments to facilitate the dispatch of this work. It is advantageous, as a matter of economy in the rehandling of goods which this operation necessitates, and also desirable from other points of view, that stocks shall not be enlarged beyond the limits required to meet current demands between now and January 1. This is especially true at the present time, since there are no signs apparent of an immediate general rise in values that might induce buying of a speculative nature. If any doubt, indeed, exists touching the stability of prices, it would seem, in view of tariff revision prospects, it would be the other way about. As a factor in the situation marketwise, however, this influence has thus far had no visible effect upon the Hardware trade, though the possibilities involved in the final disposition of the question are, none the less, not being lost sight of by manufacturers and distributers. The present month has been one of decided progress in some lines, while others have drifted along without much evidence of added stimulus. Wire products have been and still are the leaders in firmness and activity. Nails and Fencing keep moving in a way that betokens a healthy power of assimilation among consumers, when it is reflected that in face of the comparatively heavy shipments of these commodities that have been going forward, stocks are still said to be on all hands abnormally low. Although prices on Woven Wire were announced over two weeks ago, the volume of orders so far entered for spring shipments is relatively light; but this offers no ground for discouragement, as a rush of early buying was not expected. The relatively high prices now ruling in Scrap Material and the advancing tendency in Pig Iron has toned up the rougher finished Cast Iron goods, and while there has been no general marking up of prices in such lines, the market is firmer and less susceptible to pressure for concessions. Melting Scrap suitable for Sash Weights is now practically on a level with new Iron of the lower grades, so that the margin between cost of production and unadvanced selling prices is correspondingly shortened. Sash Weights are being held by jobbers at around $20 to $21. The recent bulge in Copper Metal did not last long enough to seriously affect values in finished goods, which are holding fairly steady. Prolonged building weather has greatly helped outside construction work, which up to this time has gone on with but little hindrance, except in extreme Northern territory.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market continues steady and strong, without any excitement whatever, but with intimations here and there that if something happens or does not happen, as the case may be, there will be an advance, and, therefore, it is advantageous for buyers to lay in their supplies for the coming year. The time has come when we can no longer neglect 1909 for the sake of one that is drifting into the irrevocable past. Certain it is, however, that nobody seems alarmed about values. There is no great effort to

sell, at any rate not at a sacrifice, although some of the manufacturers complain that the present prices, afford a very narrow margin. The fact is they are not running full enough to put a layer of cream on top of the milk. It is in the excess production that the profit comes. The short time, partial operation, is when the expense mounts up unduly.

We were here in Louisville, as we desired to be, beneficiaries of the Memphis meeting, in getting a good many of our friends to stop en route. Brains by the carload went through here without any fear of molestation on the part of the Interstate Commerce Commission. By its recent rulings, be it said, on Ammunition and other inflammables and explosives, it is increasing our cost of packing and doing business generally. Are not our friends in the Hardware business likewise suffering?

Now every one's face is turned toward the Christmas time, and while in a certain way Christmas shopping may not be as vigorous as in some years past, or at least not on the same extravagant scale, there is a manifest willingness to discount the future a bit on the part of nearly everybody, and when you say everybody you mean that the retailer and the shopkeeper are going to reap the harvest.

The settlement of the tobacco war which has been carried on between the National Tobacco Association and the planters' combine has been finally effected. This offers a great financial relief to this part of the country, but it would seem as though the criminal courts may have more or less to say on the subject before the results of ambushing, night riding and white capping shall be forgotten. There was much dissatisfaction toward the close, as the restraint seemed very onerous. Possibly another year things will be managed better.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Since our last report there has been no material change in the business conditions in this section. The Hardware trade has not been satisfactory this fall to the jobber or retailer, as the volume of business has been rather light. There are several reasons which have encouraged the spirit of conservatism among the buyers. The section of Tennessee and Kentucky which raises tobacco has been unable to make ready sales at satisfactory prices, and in addition to this, business in this section has been greatly disturbed by the night riders. The lumber and timber business of the South has been dull for 12 months. This necessarily reduced greatly the volume of Hardware business. The phosphate industry, which is no small one and which for several years has been on a boom, has been almost paralyzed for the past 12 months. The agricultural districts are in good financial condition, are making money and seem to need but few things. When the spirit moves them again to trade, they will be in better condition to do so than they have been for years. We believe business will be much better after January 1, but our prophecies haven't always panned out 100 cents on the dollar.

Cleveland.

W. BINGHAM COMPANY.—The advance agent of prosperity is on the road again and the orders he is daily sending to the jobbers in this market indicate that he is showing up his samples and his prices are so good that the trade cannot resist him. Truly, we are enjoying a splendid good trade for this time of the year, not only selling a large volume of holiday goods, but a lot of goods in the general Hardware line.

Production on many lines has been curtailed for nearly a year and it is also true there has been a curtailment of consumption, but it looks very much from now on that consumption would exceed production, and will press hard upon any reserve stock that the manufacturers and jobbers may have on hand. Conditions throughout the nation warrant the manufacturers of our country in speedily increasing the output.

Just stop and think! Our Bureau of Agriculture at Washington informs us that the income from United States farms will amount to $8,000,000,000 this year. Really, now, when we stop and think what an immense amount of money this is, to be distributed in all quarters of our country for different commodities, it goes to prove that we are the greatest consumers of all kinds of goods of any people on the face of the earth. Why? Because we have the wherewithal to pay for them.

The exports in foodstuffs are also remarkable. It is reported one of the large Cunard liners steamed out of New York Harbor last week with the largest cargo from that port this year; one item was 170,000 bushels of wheat and another item 7000 barrels of apples. This would indicate that the people on the other side of the water understand and appreciate one of the great American favorite deserts—viz., apple dumplings.

The general Hardware orders are getting longer and longer and larger and larger in quantity, and we believe that the last 60 days of this year will help to round up old 1908 so that 1909 will have to pick up briskly to show what it can do in the way of trade and traffic. We advise our friends to sort up their stocks on all Hardware, especially house trimmings, for there will be a large demand for them, we think, early next year. A lot of buildings are being contracted for, and the remarkable open fall weather we have had has enabled contractors to start in early on many buildings and they will want Builders' Hardware in good volume soon to complete jobs.

A lot of inquiry for Steel and Iron Merchant Pipe and Malleable, Cast and Brass Fittings show that the factories are starting up, and contracts for Drills and Files are being placed.

Shovels, Spades and Scoops are a good purchase at present prices. A number of weak Shovel manufacturers have dropped out, but the stable manufacturers are not going to take advantage of this and are holding the market on these goods firm and steady.

We say place your orders now for Refrigerators; they are a good thing to buy early. The leading manufacturers of these goods have put on a lot of improvements this year, and, considering the price of lumber, metals, also wages, we consider them a good purchase at the present time.

Corrugated and Crimped, Painted and Galvanized Roofing, Plain Black and Galvanized Sheets, Roofing and Bright Tin Plates, Galvanized Spouting and Eave Trough are a good purchase at present prices for immediate shipment or shipment up to April 1 next. We do not recall any previous year at this time when there was so much call for building material of all kinds as at present, showing that many are interested and are doing or expect to do a lot of business in this line and are preparing for it.

Thanksgiving Day this year was probably the most thankful day that many of our people have enjoyed for some time past. Why? Peace and plenty reign within all our borders, for which millions of hearts and voices went out in song and praise for the many and great benefits we are enjoying all over our beloved land, and we are looking forward with high hopes to a splendid business in the days to come.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The apparent happiness of many persons in our city during the last few weeks is something wonderful. As an illustration, the new Philadelphia Opera House, which was opened November 1, has been filled to its capacity every performance, notwithstanding the high prices for admission, and the fact that it accommodates over 1000 persons more than the Academy. The grand opera at the rival Academy of Music has also been remarkably well patronized, while the theaters have been crowded to the doors. The football game at Franklin Field, between Pennsylvania and Cornell on Thanksgiving Day, was attended by some 30,000 people, and before all the tickets were sold the price had been materially advanced by those who had probably bought at the regular prices to sell again. Again Saturday all the persons who were anxious to see the game between the Army and Navy could not get in. Very many persons came from other cities and many of the tickets which had been distributed were sold at $5 and upward. Now all this is wonderful although we don't know but we are sorry to see this spending of so

much money. However, several million of red cross Christmas stamps have been sold for distribution.

Regarding general business, it is reported that the exports of certain kinds of goods have largely increased not only in New York but in Philadelphia, and including the last two months exports are far in excess of what they have been for some few years past.

Since our last letter the trade of many manufacturers has largely increased and they have largely increased the number of employees. Christmas trade in the department stores has begun, and it is expected to far exceed the business of 1907. It would be well if the retail Hardware trade throughout the country would realize the improvement in the situation and energetically push the sale of goods in their stock suitable for the holidays.

Hardware manufacturers report improved trade and the jobbers of the country are reporting better conditions. Many in the retail trade have enlarged their orders and report themselves encouraged for December and early in January.

The banks, trust companies and savings fund societies state that their deposits are still very large. What we mean by this is that the calls on banks for loaning money are not so great as anticipated with improved trade, but they look for larger requirements after January 1 as trade increases.

Portland, Oregon.

FAILING-MCCALMAN COMPANY.—At this Thanksgiving season, looking back over the past year, it would seem that really we out West have a great deal to be thankful for. Our business in this territory has been very close to last year's in all lines and has now revived so that it is even better than last year. Our crops have been wonderfully good, and prices in all lines even more than good.

The development of the country out here has not been delayed by the recent stringency to anything like the extent we feared. New people have been coming in; our small towns are growing; our large ranches and farms are being subdivided, and there is more of a field to sell Hardware in every day.

One special cause for Thanksgiving to us who do business in Portland is the fact that the Northern Pacific and Great Northern railroads have built a water grade railroad line down the north bank of the Columbia, thereby opening up to us a large country which has hitherto been more or less exclusively Tacoma and Seattle territory. This piece of road, we may mention, is supposed to be the best and most expensive piece of original construction in the United States.

But thankful as we are this year, and many things as we have to be thankful for, as we look forward to 1909, we really expect that we will have more things to be thankful for next year than ever before, for as nearly as one can see we have before us here the most prosperous and busiest year in the history of the Pacific Northwest, and we certainly hope that this will hold true over the rest of the country.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—The month of November closes with trade conditions in the trans-Missouri region in a very favorable position. Business in all lines continues satisfactory, and the volume of goods going into consumption daily progresses with a steady regularity. While the people of this section of the West suffered least from the industrial depression of last year, and therefore had less ground to regain to get back to the high record mark of business prosperity, the gradual restoration of normal conditions in the East is already producing a reflex stimulus throughout the West.

While not predicting a repetition of the old boom days with their accompaniment of wild speculation, the consensus of opinion of careful observers hereabouts forecasts a steady and unprecedented growth throughout this entire territory. All this activity will undoubtedly beget for us new population, and this army of consumers furnishes the life blood to the arteries of trade.

Unless all signs fail the growth and prosperity of this section of the country is looked forward to with general confidence.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—General business is running along in satisfactory volume. This time last year we were in the throes of the panic, and, therefore, a comparison of sales with last year shows a very gratifying increase.

The large number of applications we are receiving, both from salesmen and from house employees of other jobbers, indicates a spirit of dissatisfaction and unrest. No doubt all jobbers have noticed this increase in such applications. We have passed through a hard year. Salesmen and house men have worked just as hard or harder than in other years. No advances in salaries are in sight. On their commission and profit sharing arrangements salesmen will suffer in this year's settlement. All such things are a natural finish to a year following a panic.

The proprietors and stockholders of the various manufacturers and jobbers in the Hardware line have already discounted the year's statement. They expect and are prepared for a shrinkage in results. They do not anticipate large dividends or an overfed surplus. They have decided it is the part of wisdom to accept the situation cheerfully and to be thankful conditions have been no worse.

It is only fair that salesmen and employees should take the same attitude. "The fields are always greener just a little further on," but when you get into the other green field you see the grass is no thicker than in the old field you left. Therefore, employees who are indulging in this spirit of unrest should be careful that in "jumping from the frying pan they do not land in the fire."

Many retail merchants also feel they do not receive returns from their business commensurate with the efforts they put forth. Competition is increasing and profits are being cut down. Many feel they do not receive their share of the distribution of profits.

All these things come to us at the finish of the year's business when we take our annual inventory and then look over the figures. The only advantage to be derived from studying the figures of a year of decreased sales and decreased profits comes from the plans which, as a result, may be laid for the future. To be up against the real thing occasionally brings our thinking down to earth and the realities of business.

To our way of thinking, the paramount duty before the jobbers of this country is to see that trade is held closer in the proper channels. The ever-smiling manufacturer who brings down his cost of manufacturing on jobbers' large orders and then goes out and adds to his profit account by selling the retailer—the legitimate customer of the jobber—should have his attention brought to the fact that the jobbing trade are on to his curves. This can be done in a properly deliberate, grave and judicial manner.

While many manufacturers have found from experience the expense of going direct to the retail trade makes this class of business unprofitable, still there are others who have one salesman who visits the large jobbers while another salesman cultivates even the small retailers. Of course the salesman who visits the large jobbers truthfully states he calls only on the jobbing trade, and the other salesman for this factory, who calls on the retail trade, crosses his heart, rolls his eyes heavenward, and declares he sells the retail trade at the same price at which the large jobbers buy.

The small retail merchant feels much complimented at a visit from the man direct from the factory. He makes up his mind he is cutting out the profits of the middle man and he places an order for enough goods in that line to last him two or three years. And strange to say, he does this frequently when he could buy the same goods at the same prices in small lots from his jobber.

Recently the writer employed a special Cutlery salesman who had been traveling for a Cutlery manufacturer. This man went over our line and afterwards showed me a list of a number of our customers to whom he formerly sold the manufacturer's line, and he laughingly

remarked that with the exception of a few staple patterns he used as order starters, he obtained a better profit for the manufacturer than we price the same line of Pocket Knives. He used the argument with the retail dealer he would call only twice a year and therefore on each visit they bought what they thought was a six months' stock.

This salesman, when he traveled for the manufacturer, sold nothing but Pocket Cutlery. He showed me his salary and traveling expenses were just a little less than 20 per cent. of his total sales. To be exact, his sales were $20,000 per annum, his salary was $1800, and his expenses were $1800. It cost the manufacturer $3600 to sell $20,000 worth of Pocket Knives to the retail trade. Still the retail dealers who bought from this salesman flattered themselves they were cutting out the jobbers' profit. Jes so! Jes so!

It seems to me one of the main things for the retailer to consider the coming year is whether he is not allowing other dealers in town in other lines to take away a lot of profitable business from him. I mean allowing these other dealers to take the business because he does not carry the assortment, does not display the goods properly and does not push their sale. Let me illustrate by one little item:

As we all know, as a result of the Safety Razor, there has been a tremendous increase in the number of men who shave themselves. Except for hair cutting the barber shop is gradually becoming extinct. Every retail Hardware dealer knows thousands and thousands of Safety Razors are being sold. He may also know the sale of Safety Razors is actually increasing the sale of old fashioned Razors. Many men form the habit of shaving daily with a Safety Razor and finally go back to the old fashioned Razor because it is less troublesome. We are all creatures of habit. A man who forms the habit of shaving every day feels, if he does not shave, just as if he had failed to wash his face. On account of the Safety Razor we have become a well shaved nation.

But here is the point: Every man who buys a Safety Razor must have shaving soap and a shaving brush. He may not have a Strop, but he must have soap and brush. Has this idea permeated the retail Hardware dealers?

Recently the writer in taking a horseback ride visited a suburban town near St. Louis. He entered a Hardware store. In the showcase were a few Shaving Brushes that looked as if they were suffering with a severe attack of the mange. No shaving soap was in sight. There were several Safety Razors. But in the drug store at the corner was a fine display of Shaving Brushes hanging up on strings in the show window. A corner of the show case was filled with shaving soap. They also carried Safety Razors. The drug store was fresh, clean and attractive. The Hardwareman did a Cornice and Tin business and his store looked more like a factory than a place in which to sell goods.

Have the retail Hardware trade sold the Shaving Brushes and the shaving soap and the Safety Razors? Have they made displays? Do they take advantage of the changing conditions in their line of goods, or do they allow their competitors in other lines in the same town to get the best of them simply because they are better and more up to date merchants?

Of course if the jobber's salesman happened to go to that town where the drug store was selling the Shaving Brushes, and if he happened to sell the drug store, there would be a howl from the galvanized iron manufacturer who calls himself a Hardware dealer. Therefore, the Hardware salesman sticks to the Cornice maker, and the wholesale drug, dry goods and stationery houses sell the Shaving Brushes and the shaving soap, which it seems to me belong to the Hardware trade. And the Hardware salesman and the Cornice maker shake their heads at each other and say, "it has been a bad year and we hope next year will be better."

JOHN L. WALKER, formerly auditor for the Buda Foundry & Mfg. Company, has resigned to accept the position of manager of the socket department of the American Specialty Company, 1440 Monadnock Building, Chicago, Ill.

NOTES ON PRICES.

Wire Nails.—Specifications on contracts are being received in good volume, while new orders are not so frequent owing to the approach of stock taking time, during which ordeal minimum stocks are desirable. Business for November has been satisfactory, insofar as it has shown an increase over the month previous. The market is firm and it is understood that regular prices are being maintained. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.95
Carload lots to retail merchants	2.00
Less than carloads to jobbers	2.00
Less than carloads to retail merchants	2.10

Galvanized Nails are quoted at $1 over the price of the regular Nails.

New York.—Local demand is of a spasmodic character, being fair for a day or two and then dropping off. In some sections of Greater New York considerable building is projected, which promises business later, when Nails are required. Nails are held on the basis of $2.30 per keg in small lots at store, but some sellers are occasionally inclined to shade this figure.

Chicago.—There are no signs of wavering apparent in the steady flow of orders for Wire Nails. Not only are specifications coming out in satisfactory volume, but new orders are being placed quite freely. The business for November will show a slight increase over October, and specifications, the principal interest for November, will be practically double those of the same month last year. A few buyers are asking that shipments be deferred until the latter part of December, in order to facilitate the taking of inventories. Prices are firm and regular. Quotations are as follows: $2.13 in car lots to jobbers, and $2.18 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—It is getting close to the end of the year when the jobbers and dealers will soon commence to take inventory, and this to some extent is holding back new orders for Wire Nails. Only a fair amount of new business is being placed, and manufacturers believe that after January 1, new demand will materially improve, and all anticipate a very good business in Wire Nails next year. We are advised that specifications against contracts are coming in fairly well, and prices are reported as being absolutely maintained. Quotations for base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.95
Carload lots to retail merchants	2.00

Galvanized Nails are quoted at $1 over the price of the regular Nails.

Cut Nails.—Business at the mills is more in the line of specifications on contract orders than in new orders. Buying is still restricted to actual requirements and to small lots. In sympathy with general business conditions the Cut Nail market is showing more stability. The price for Steel Cut Nails is $1.80, base, per keg, f.o.b. Pittsburgh, for less than carloads, and $1.75 for carloads and larger lots. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

New York.—There is a comparatively fair demand for Cut Nails in this market, but this is restricted to actual requirements which are moderate. Steel Cut Nails are held on the basis of $2.15 per keg for small lots at store, but this price is not strictly adhered to by all sellers.

Chicago.—Considerable improvement is observed, both in the general run of orders and a firmer tone in the market. The mills are as a rule adhering pretty closely to regular prices, which are now reported as being evenly maintained. Buying, however, is restricted in most cases to immediate or nearby requirements. We quote Chicago prices as follows: In car lots to jobbers, Iron Cut Nails, $2.08; Steel Cut Nails, $1.98.

Pittsburgh.—The manufacturers of Cut Nails have re-

affirmed prices which we are advised are being well maintained, concessions having practically entirely disappeared. Demand is rather light, being confined mostly to small lots for actual needs, but the trade is specifying fairly well against contracts. The season for stock taking will soon be here, and orders will be held up as much as possible until after the first of the new year. The market on Cut Nails is reported as in fairly satisfactory condition, and a larger volume of business is anticipated after January 1. The market is $1.80, base, per keg, f.o.b. Pittsburgh, but $1.75 is made on carloads and over. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

Barb Wire.—The continuance of mild weather is having the effect of extending the season in which Fence building is practicable, so that demand, while moderate, is somewhat in excess of the usual volume for this time of the year. According to reports regular prices are being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.10	$2 40
Retailers, carload lots	2.15	2.45
Retailers, less than carload lots	2.25	2.55

Chicago.—The prolonged open weather which still makes outdoor construction possible, even in Northern territory, bids fair to merge the fall and spring buying season without the usual interim. A fair amount of new business is being placed, and shipments are going forward more briskly than is usual at this season. We are advised that prices are being rigidly maintained by the mills. Quotations are as follows: Jobbers, Chicago, car lots, Painted, $2.28; Galvanized, $2.58; to retailers, car lots, Painted, $2.33; Galvanized, $2.63; retailers, less than car lots, Painted, $2.45; Galvanized, $2.75; Staples, bright, in car lots, $2.25; Galvanized, $2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Only a small amount of new business is being placed with the mills, but it is somewhat larger than usual at this season of the year, this being due to the very favorable weather we have had for some time. Manufacturers believe that after the period of inventory is over and plans outlined for the new year, demand for Barb Wire will show some betterment. The tone of the market is firm, and the mills advise us that regular prices are being well maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.10	$2.40
Retailers, carload lots	2.15	2.45
Retailers, less than carload lots	2.25	2.55

Plain Wire.—A fairly good demand includes new orders and specifications on contract orders. The mild weather doubtless contributes largely to the condition of trade for this season. It is understood that regular prices are being maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.80 for Plain and $2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Chicago.—The promising outlook for spring trade in Fencing and the continuance of a fair fall demand, which as yet has not been cut off by severe winter weather, is responsible in a large degree for the good movement in Plain Wire. Fence and other manufacturers are ordering in more liberal quantities than for some time and shipments against contracts are going forward in fair volume. Prices, we are advised, are being steadily maintained. We quote as follows: Car lots to jobbers, $1.98, f.o.b. Chicago, and to retailers, $2.05.

Pittsburgh.—A fairly large amount of new business is being placed, particularly from Wire Fence manufacturers, and specifications against contracts are also being received in fairly good volume. Consumers of Plain Wire will soon be taking stock and cleaning up this year's business, but it is believed that shortly after January 1 demand for Fence Wire will be materially larger. The outlook for next year is regarded as quite satisfactory, the farmers having had good crops this year and received high prices for their products. We are advised that regular prices are being well maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.80 for Plain and $2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Sash Cord.—The tone of the Sash Cord market is unmistakably strong, although no general advance has taken place. Some manufacturers have withdrawn extreme prices, and one or two are quoting Cord a cent or so higher than a short time ago. It is reported that manufacturers are endeavoring to effect a concerted advance, although it is by no means certain that this can be accomplished under present conditions.

Cast Iron Hardware.—Some lines of Cast Iron Hardware, such as Blind Hinges, Gate Hinges and Latches, &c., have for some time been selling at a low level, due largely to new competition in the market. Declines have recently occurred in Well Wheels, Hay Fork Pulleys, Shoe Lasts and Stands, &c., and the market presents a decidedly irregular appearance at the present time.

Coat and Hat Hooks.—Low prices continue to prevail on Wire Coat and Hat Hooks, competition being keen as usual, and leading to a considerable irregularity in quotations, although the lowest prices have not been met by some manufacturers. The market may be represented in a general way by a discount of from 80, to 80 and 10 per cent.

Chain.—A noteworthy feature of the Chain market is that the irregularity which has long prevailed in Coil Chain has been communicated to Trace Chain, Cow Ties, &c., which are now quoted at unusually low prices. German Pattern Coil Chain is also weak, especially as regards the larger sizes.

Shovels.—As stated in our last issue, the revision of prices which has been made by the houses constituting the Ames Shovel & Tool Company, represents a reduction on all classes of Shovels. On third and fourth grade goods the decline is about 7½ per cent., and on better grades about 5 per cent. For some time the Shovel market has shown considerable irregularity, especially as regards the quotations of independent manufacturers, and the present movement is believed to be in recognition of the situation.

Rope.—The demand for Cordage lacks steadiness. Another feature of the situation is the receipt of urgent requests for prompt shipments, showing that buyers are carrying light stocks. Some manufacturers have shown a willingness to contract with jobbers for their next season's supply at quite a reduction on present quotations. The market is reasonably strong for small quantities of Rope at the following quotations: 7-16 in. in diameter and larger: Pure Manila, 8¾ to 9 cents; Pure Sisal, 6¾ to 7 cents. Mixed grades of both kinds grade down in price according to quality. Jute Rope, ¼-in. and up, No. 1, 6½ to 6¾ cents; No. 2, 6 to 6¼ cents.

Window Glass.—Jobbers have been carrying comparatively light stocks of Glass for some time, but in anticipation of a larger demand at the approach of colder weather they have been making more liberal purchases. The prospect of the formation of the Imperial Glass Company is becoming more remote, and according to reports the outlook for a consummation of the project is anything but encouraging. A meeting of the Eastern Window Glass Jobbers' Association is scheduled for this week, and the Western Window Glass Jobbers' Association will also meet early in the month. General market conditions will be discussed at both of these meetings. A great deal of uncertainty as to the future market conditions has been forced into the situation by doubt as to the probability of an agreement among manufacturers. No official change in prices has become public and as heretofore the American Window Glass Company's prices of 90 and 35 per cent. discount on Single and 90 and 40

per cent. discount on Double Strength Glass, have been a basis for hand operated factory quotations. These quotations have, without doubt, been shaded in some instances, at least to the extent of 5 per cent., while Glass in second hands has been quoted still lower. Minimum prices recommended by the Eastern Jobbers' Association from jobbers' list, October 1, 1903, are as follows: All sizes single and double strength Glass, covering territory east of Chicago, 90 and 20 per cent. discount. These prices are more or less elastic, according to circumstances.

Poultry Netting.—An appearance of irregularity, not to say weakness, has been imparted to the market for Poultry Netting because of price cutting which is being carried on by jobbers in some sections. The situation has indeed become so acute as to command the attention of the manufacturers who are taking the matter up with their jobbing customers and urging them to co-operate in maintaining the uniform selling price which the producers have endeavored to establish. Manufacturers' prices to the jobbing trade are, it is declared, satisfactorily adhered to.

Spool Wire.—Some manufacturers have just made an advance of about 5 per cent. in their quotations on Spool Wire.

White Lead in Oil.—The market is steady and prices are being maintained. The demand, while moderate, is considered satisfactory for the season. Quotations for best brands are as follows: Lots of 500 lb. and over, in 100-lb. kegs and upward, 7 cents per pound; in lots of less than 500 lb., ½ cent. per pound advance.

Linseed Oil.—The upward tendency in the price of Seed has not affected the price of Oil, neither has it quickened the demand. Some of the large buyers covered their requirements for some time ahead before the recent advances, but are not specifying very liberally on their contracts. Others who did not are buying just enough for their requirements from time to time. The trade are pursuing a hand to mouth policy in buying. Taking it all in all it is a very dull market. Quotations in 5-barrel lots are as follows: State and Western Raw, 47 cents per gallon; City Raw, 48 cents per gallon. Boiled Oil is 1 cent advance on Raw.

Spirits Turpentine.—The market is steady and the demand moderate. While the receipts of Turpentine at Savannah and Jacksonville are beginning to fall off the demand is likely to show some slackening, as usual about this season. The market at this point has held steady during the week, and former prices are still in force. The New York market is represented by the following quotations: Oil Barrels, 42½ to 43 cents; Machine Made Barrels, 43 to 43½ cents per gallon.

MILES A. HOFFMAN of Miles A. Hoffman & Co., importers of and manufacturers' representatives in Builders' Hardware, Wire Nails, Rivets, Staples, Engineers' Supplies, Motor Sundries, Silver and Electroplated Goods, Pressed and Stamped Metal, Electrical Supplies, &c., 43-45 Great Tower street, London, E. C., England, is now in this country. Mr. Hoffman will be in and around New York and Philadelphia during the month of December and a part of January. His address is care of Union League Club, Philadelphia, and he will be pleased to hear from manufacturers, especially of Hardware articles, who are desirous of placing their goods on the English market.

THE READING HARDWARE COMPANY, 96-98 Reade street, New York, will on or before February 1 be in possession of new quarters at 50-52 Franklin street, near Broadway. The space area will exceed that now occupied, the prospective accommodations including a street floor and basement, each 46 x 92 ft. The plans now under consideration contemplate general offices, sample room and a room with suitable facilities for the preparation of estimates on contracts and other important specifications requiring expert treatment. There will also be a much more adequate stock carried of Builders' and other Hardware than heretofore.

DEATH OF GEORGE W. CORBIN.

GEORGE WALDO CORBIN died Monday night, November 30, at his home in New Britain, Conn. He had suffered from an ailment that had given himself and friends concern for a year or more, but until recently he had believed that his condition was improved. He was a man known for his singularly cheerful and sunny disposition, his strong mentality and his marked business ability. He had not only won distinction as a successful manager of established enterprises, but was of the quality that creates and organizes new industries, two of which he had started in New Britain in the past year, known as the Corbin Bros. Company, the Dean Steel Die Company and the Corbin-Church Company.

George W. Corbin was born in New Britain March 4, 1859, being the son of Waldo and Emily M. Corbin, and was a nephew of Philip Corbin, president of the American Hardware Corporation. He had lived in New Britain all his life, except the interval spent at Wilbraham, Mass., continuing the course of his education begun in the grammar and high schools of New Britain. From school he entered the employ of P. & F. Corbin, with the purpose of mastering the business from the bottom, seeking no favors because of the close connection by birth

GEO. W. CORBIN.

with the founders of the house of Corbin. He began his career as a timekeeper and remained with the firm until 1880. He then became identified with the Corbin Cabinet Lock Company, which was started as a department of P. & F. Corbin, being first an invoice clerk. When the growing enterprise occupied its own premises opposite the main factory, he went with it, and soon rose to the position of secretary, becoming successively treasurer and president. He was the active manager of the Corbin Cabinet Lock Company for years and covered the entire country in the company's interest, visiting, it is said, every State. His relations with the company were terminated last May. Mr. Corbin had previously bought a large block of stock in the Union Mfg. Company and in the reorganization which immediately followed he was elected president. He exerted the same energy and business foresight in the affairs of the Union Company that he had in the Lock Company, making it, it is stated, one of the most prosperous of the local manufacturing plants.

His creative ambition also led him to start the Corbin Bros. Company, which produces a line of Trunk, Suit Case, Wardrobe, Chest and Drawer Locks, Padlocks, &c. He was, likewise, instrumental in establishing The Corbin-Church Company and Dean Steel Die Company, having been president of both. He was prominent in founding the People's Savings Bank, becoming its president; was a trustee in the New Britain Trust Company, and

a director of the Sovereign Trading Company, besides having other financial interests.

Politically he served the city as Councilman and was elected Mayor of New Britain in 1894, on what was known as the reform ticket, working for the first two years under a new charter which was adopted at that time. He was a member of the School Board and especially active on its Finance Committee. A man of great personal popularity, Mr. Corbin was often in demand to preside at banquets and kindred occasions, partially perhaps as the possessor of a keen wit and practically inexhaustible fund of stories. He was a thirty-third degree Mason and belonged to various lodges and chapters in that order, was an Odd Fellow, Elk and member of other fraternal and patriotic organizations. Among the clubs he belonged to are the Kenilworth, Maple Hill Golf, Seneca and New Britain Clubs and the Machinery Club of New York.

Mr. Corbin was exceedingly democratic in demeanor, always approachable, of an attractive personality and high character and possessed of a pleasing and winning manner that constantly won and retained hosts of friends. He is survived by a widow and four daughters.

AMONG THE HARDWARE TRADE.

The Bandon Hardware Company has purchased the business of T. W. Robinson, Bandon, Ore., and will handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods.

The corporate title of the King Hardware & Stove Company, Salt Lake City, Utah, has been changed to Scott Hardware Company. The management and interests will be the same as heretofore.

The Hardware business of J. A. Hollenbeck, Rockford, Ill., has recently been incorporated under the title of J. A. Hollenbeck Hardware Company, and now occupies the first floor and basement of the new Hollenbeck-Bennett Block, 44 x 76 ft. The new storerooms are equipped with the Warren cabinet shelving. The stock carried comprises a full line of Shelf and Heavy Hardware.

Charles W. Simon will establish a Hardware store at Burchard, Neb., which will be operated as a branch of the Hardware business conducted by Mr. Simon at Pawnee City. Emmett McCreary will be the manager in charge of the Burchard store.

Fred. W. Barris and G. Albert Kenyon have purchased the business of the Hardware & Mill Supply Company, Inc., Pittsfield, Mass. Mr. Barris has been associated with the company for many years, and Mr. Kenyon has had a wide experience in the sale of steam supplies and kindred lines. The business will be continued under the same style as heretofore, Mr. Barris being the president of the company and Mr. Kenyon the treasurer.

H. P. Frantz has purchased the Hardware and Implement business of A. A. Marchel in Hartford, Kan., and has moved the entire stock to Orianta, Okla.

E. Parker & Sons, Jesup, Iowa, recently suffered loss by fire amounting to between $1500 and $2000, fully covered by insurance.

The Hardware store belonging to J. L. Nessly, Mulvane, Kan., was recently damaged by fire to the extent of $4000, the loss being fully covered by insurance.

The business formerly carried on by A. A. Shuford, Jr., under the name of Shuford Hardware Company, Hickory, N. C., has been sold to Lyerly Brothers of Hickory, who will continue under the same name. They will increase the stock of general Hardware in both wholesale and retail departments.

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A MERCHANDISE PARCEL POST?

A PETITION FROM WISCONSIN.

We reproduce herewith in facsimile a petition from Berlin, Wis., which was prepared as a result of the suggestion of the editorial in last week's issue of *The Iron Age*. C. A. Peck of that city, secretary-treasurer of the Wisconsin Retail Hardware Association, is to be credited with the inauguration and circulation of the petition, which, it will be observed, expresses the opinion in regard to parcel post legislation of nineteen-twentieths of the business community of the town. It will be noted that practically every line of business is covered by the signers of the petition, including Hardware, groceries, drugs, clothing, books and stationery, tailoring, boots and shoes, dry goods, furniture, insurance and real estate, restaurant, &c. Mr. Peck, as secretary of the State Retail Association, has also mailed a request to the members of the association urging them to get in touch with their Representatives in Congress and endeavor to secure their support of the view taken by the retail interests of the country of the blighting effects of a parcel post.

In view of other advices we feel confident that the example of Berlin will be followed by many other communities, and in this way the national legislators will have brought home to them the country-wide extent and scope of the opposition to parcel post legislation.

POSTMASTER-GENERAL'S PLEA FOR RURAL ROUTE PARCEL POST.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., December 1, 1908.

THE correspondent of *The Iron Age* is enabled to present below the text of that chapter of the Postmaster-General's forthcoming annual report dealing with the proposed parcel post for rural routes and the authorization of a post check currency. The report will be read with interest throughout the Hardware trade, for although the Postmaster-General advocated a similar project a year ago, he has never before undertaken to state in the course of an official report how he would prevent the catalogue houses from utilizing the proposed limited parcel post.

The limitation upon the use of the projected facilities, excluding all but merchants who are "bona fide residents of the towns in which the distributing offices are located," and barring "any person acting as agent for a concern located outside of the limits of the rural routes" is so preposterous that it will undoubtedly cause much amusement. The proposition is none the less serious, however, for the real danger is that Congress will adopt the scheme without any such absurd and wholly unconstitutional restriction as is suggested.

BERLIN, WIS. NOV. 27th, 1908.

WE, THE UNDERSIGNED, RETAIL MERCHANTS OF BERLIN, WISCONSIN, HEREBY PROTEST AGAINST THE PASSAGE OF ANY PARCEL POST BILL, AS WE BELIEVE IT WOULD BE NOT ONLY INJURIOUS TO US, BUT ALSO TO THE THRIVING CITY IN WHICH WE LIVE, AND WE FURTHER BELIEVE WE EXPRESS THE OPINIONS OF 19/20ths OF THIS COMMUNITY IN THIS PROTEST.

Names	Business
C. A. Peck & Hdw. Co.	Hdw.
Wurst & Wanner	Grocers
John Bradberg	Tailor
J. W. Slater	Druggist
Jeg Longstroff	Jeweler
E. T. Delaforte	Jewelers.
E. B. Stirling	Clothier
Lotta L. Smith	Books & Stationery
H. W. & O. A. Penman	Books & Shoes & Furniture
Hamilton Bros	Boots and Shoes.
Leo P. Laing	Restaurant
Elk's Lodge	Clothing Dealer
Leopl Engelmann & Co	Boots & Shoes
Quayle & Peterson	Groceries
Thos. M. Heney	Jeweler
Edw. O. Kawalski	Clothing Manufg
A. Epstein & Co	Gen. Store
W. G. Groffman	Dry Goods.
Thomas & Co.	Dry Goods.
Connell & Forst	Clothing
Percy T. Talbot	Furniture.
Kraege & Co.	Books
Wm. Hirthler	General Store
C. H. Ruddock	Dry Goods
H. J. Hamilton	Clothing
J. Jenkins	Grocery
John Wesenberg & Co	Furniture
F. M. Foster	Green
J. Warzynski	Hardware
Chas. H. Stilwell	Ins. & Real Estate
HDW. DEAL. MUT. FIRE INS. CO OF WIS.	
C. A. Peck	See Wis. State Hdw. Ass'n

Petition in Opposition to Parcel Post from the Business Interests of Berlin, Wis.

As recently predicted in this correspondence, the Postmaster-General, after discussing the rural parcel post at some length, proposes the "entering wedge" of an experiment limited to four counties, the results to be reported to Congress. It is this suggestion that it is understood the President will endorse in his forthcoming message to the House and Senate.

Extracts from the Postmaster-General's Annual Report.

The chapter of the report dealing with the local parcel post scheme is as follows:

The rural delivery system continues to grow, and on November 10, 1908, there were in operation 39,516 routes, with a patronage of more than 18,000,000 people. In many States practically the entire area available for rural delivery is now covered with a network of rural routes. There was, however, a great increase during the past year in the number of petitions for rural service in different parts of the country.

Rural delivery is now established on nearly 1,000,000 miles of roads throughout the country. During the current fiscal year the rural carriers will be required to travel more than 200,000,000 miles. Thus the necessity for good roads becomes more apparent. The policy of the department in insisting that all roads covered by rural delivery shall be maintained in traversable condition throughout the seasons has resulted in greater advances toward universal good roads than ever before in the history of rural delivery. The legislatures of several of the States have enacted progressive road laws and made liberal appropriations for road building and improvement.

An evidence of the growing usefulness of rural delivery is the increased quantity of mail delivered and collected. While no exact figures are now available giving the amount of mail handled by rural carriers, it is estimated to be nearly 2,000,000,000 pieces for the last fiscal year.

The expenditure for the fiscal year ended June 30, 1897, was $14,840, while for 1908 it was $34,361,463. What the expenditure will be 10 years from now it is startling to consider.

Rural Parcel Express.

Should the Congress grant the department authority to utilize rural routes still further by the establishment of a limited parcel post confined entirely to rural delivery routes, it would then be possible to earn additional revenue amounting to millions of dollars, and at the same time benefit the farmer by enabling him to have merchandise delivered when ordered by telephone or postal card, which would otherwise not be purchased. Frequently consumption is reduced owing to inability to secure articles at the time they are wanted. The reason for increased consumption in cities is that goods are accessible and are invariably delivered to the purchaser. This "rural parcel express" is to be confined entirely to rural routes, and there would be no cost to the Government for railroad transportation.

No merchant or dealer not a bona fide resident of the town in which the distributing post office is located or on the rural route would be permitted to have goods delivered at the proposed special rate, and packages would not be accepted from any person acting as agent for a concern located outside of the delivery limits of the rural routes. The result would be to increase the business of local merchants and country stores by facilitating consumption and the delivery of goods. It is of incalculable importance that these small dealers throughout the United States should not be driven to the wall. It has been estimated that if every rural carrier delivered 55 lb. each trip an income of $15,000,000 would be earned in one year. Were the Post Office Department a modern business corporation its Board of Directors would not hesitate 48 hr. to utilize the present machinery and establish a limited local parcel post on rural routes. With such an additional income as has been estimated the department could well afford to increase the equipment where the business demanded it.

In my last annual report the establishment of such a system was recommended for packages originating on rural delivery routes, such packages not to exceed 11 lb. in weight or 3 ft. 6 in. in length, the special rate of postage to be 5 cents for the first pound and 2 cents for each additional pound or fractional part thereof, and as follows when the weight is less than 1 lb.: Two ounces or less, 1 cent; over 2 oz. and not exceeding 4 oz., 2 cents; over 4 oz. and not exceeding 8 oz., 3 cents; over 8 oz. and not exceeding 12 oz., 4 cents, and over 12 oz. and not exceeding 1 lb., 5 cents.

The rural delivery routes will cost this year $35,500,000, and the service should be thoroughly utilized, especially where it would be to the benefit of 18,000,000 patrons. The special local parcel service will enable the farmers to have small parcels delivered at their gates, to live better, and to obtain easily the necessaries of life. The increased consumption will in turn increase the business of the local merchant, and benefit the jobber by the additional orders transmitted through the drummer.

Demonstration Asked For.

In order to demonstrate that this recommendation is a valuable one and to ascertain its practicability on the rural routes throughout the United States, I urge that the Postmaster-General be authorized and directed to establish experimentally a limited local parcel post, confined entirely to rural delivery routes in not to exceed four counties in the United States, for packages of fourth-class matter originating on a rural route or at its distributing post office for delivery by rural carriers to patrons thereof at such special rates of postage and under such regulations as the Postmaster-General may deem advisable, and that no parcel shall be accepted from any person acting as representative for any person or company not a resident on such rural delivery routes or in the town from which they emanate, and that only such parcels shall be received for delivery at the special rates of postage as are offered by bona fide merchants or dealers whose regular places of business are on such rural delivery routes, in the ordinary and regular course of their business, and in their individual capacity by residents on such routes. The result of the experiment to be reported to Congress at the beginning of the Sixty-first Congress.

Cheap Postal Note.

Concerning the time worn project for a cheap postal note, which the department has urged for several years in spite of the fact that the public appears to be totally indifferent on the subject, and to be very satisfactorily served by the present money order system, the Postmaster-General says:

The unceasing demand for the introduction of a postal note such as would enable the public more cheaply and conveniently to transmit through the mails sums of money not exceeding $2.50 impels me to renew my recommendation of last year that a postal-note bill be enacted into law at the coming session of Congress.

The bill referred to by the Postmaster-General has already been drafted, and is now before the House Post Office Committee.

TRANS-MISSISSIPPI COMMERCIAL CONGRESS STRONGLY AGAINST PARCEL POST.

At the annual convention of the Trans-Mississippi Commercial Congress recently held in San Francisco, a resolution was offered relative to parcel post and approving a proposition for a reduction of rates and an increase in the limit of weight of packages carried. This resolution was referred to the Sub-Committee on Postal Laws and Transportation, which recommended the disapproval of the resolution, and its view of the matter was sustained by the convention by the significant vote of 140 to 60. The grounds upon which the convention based its disapproval were as follows:

At present every part of the United States and its possessions are provided with just and reasonable parcel post facilities sufficient to meet all reasonable requirements.

There is no limit to the number of 4-lb. packages that may be sent by mail.

The rates of postage established are low, barely covering cost calculated on the most favorable basis for the sender.

A COMPARISON WITH FOREIGN COUNTRIES.

When distance and area are considered, the present rates are but a fraction of those charged by Great Britain, Germany and Belgium. Distances in these countries are so limited they are not to be logically compared with those of the United States.

The average parcel post distance on business originating in London is 45 miles, while the average of that originating in Chicago is 869 miles.

When population is considered the United States Government at this moment is infinitely more liberal than the countries mentioned, for they serve a congested population of 550 persons per square mile in England, 300 in Germany and 600 in Belgium, against 25 per square mile in the United States.

That congested population can be served at strikingly less cost than widely spread population cannot be for one instant disputed.

In these limited area countries destinations are reached in very short periods of time, usually a very few hours, while the parcel post of the United States reaches to five or six days within its own mainland borders, and four to six weeks to its outlying areas.

REGULAR MAIL TRAFFIC WOULD BE INTERFERED WITH.

These small countries are able to conduct their parcel post business at acceptable speed to the receivers by use of freight vans moved in slow class trains.

In America mails take precedence and must be carried on the speediest express passenger trains.

These American trains have about reached the limit as to cars that can be handled in one train at the speed the public demands.

To greatly increase the parcel post traffic would mean the delay and discomfort of travel and less speed on trains for mail traffic.

MAIL ORDER HOUSE BUSINESS WOULD BE ENORMOUSLY INCREASED.

There can be no question but the allowance of a parcel within a trifle of three times the present limit of weight and a reduction of rates will vastly increase the range of commodities

transported by mail, in fact increase of mail order business could hardly fail to be beyond present comprehension.

One single Chicago mail order house did a business last year of $53,285,000. To pay them would require the total realizations of the State of California from its citrus, deciduous vine and nut products. California calls the world to wonder, but looks rather small when she could thus support but one mail order house.

All this on the present parcel post 4-lb. limit and a 16-cent rate.

What will be the result with an 11-lb. limit and a 25-cent rate?

GOVERNMENT WOULD CONSPIRE AGAINST THE SMALL TOWN.

The moment the Government of the United States promotes such a vast increase it will not only have gone into unlimited merchandise transportation but will have formed an alliance with the great centralization of merchandising capital located in a very few metropolitan cities.

It will use its enormous power to aid a few overshadowing mail order houses against the local merchant and against the prosperity of little cities, towns and villages.

Reliable authorities state in nine European parcel post countries the rural villages have been practically ruined for trade.

CREATING A COLOSSAL POSTAL DEFICIT.

Not only will the Government use its irresistible power to advance the interests of these great houses, but under the proposed conditions and rates it will be obliged to draw from the public treasury vast sums for equipment and to make up an enormous deficit which represents no saving for patrons of these houses, but the profits to these houses the Government sees fit to extract from the people at large for the special benefit of those who are not logically or justly entitled to it.

This is back action paternalism, of which we already have had enough.

AN AUDACIOUS FALLACY INTENDED TO MISLEAD.

The statements that certain reductions proposed in behalf of a local dealer would aid him are certainly a most audacious fallacy to mislead opposition to these measures.

The territory supplied by a local dealer is limited.

Wherever a rural United States mail delivery exists carriers are permitted to serve both the inhabitants and dealers on their route at no charge if he sees fit, or such a charge as may be agreed upon, all provided the package exceeds 4 lb. in weight.

No local merchant or his patrons will find any inducement in a postal package rate equaling $56 per long ton.

The local dealer, in his relations with his customers, is passably all right now, and all he asks is to be let alone and that the Government cease discriminating against him.

LOCAL MAN COULD NOT COMPETE.

Again, the local dealer could in no conceivable way get his imprint on a catalogue that would compete with those sent out by these mail order houses.

It may be claimed simply the law of competition to the greatest degree possible that is sought; elimination not by fair competition, but by invoking Government aid at the risk and expense of the American people at large.

It is the local merchant who sustains the local newspaper, and in the larger cities the great daily and Sunday papers.

These mail order houses support in no degree the public press; they advertise to no extent. They catalogue. Who may be their printer we do not know; possibly they may own their own presses.

A ONE-SIDED PARTNERSHIP.

It seems to this committee that the promoters of this scheme, whether they realize it or not, will find in the end, if they are successful, that they have forced a one-sided partnership between the Government of the United States and the mail order houses in which the Government takes all the chances.

The ultimate effect must be that of injuring the villages and the village merchant—the town and the town merchant—the nearby city and the nearby city merchant, and even the merchant of important cities.

FOR THE FARMER TO CONSIDER.

The agriculturist and others who look only to small sums saved by greater patronage of mail order houses in great centers, may find himself the loser in the end in the absence of his merchant friends and decay of his villages, the center of his social, educational and religious privileges, all tending to the disadvantage of his children, to depreciation of his property and general lowering of country life.

While this subcommittee believes in free and equal competition, it does not believe the Government of the United States has a right to extend its favors, legitimate in a limited degree, to a point and magnitude that are destructive to vast numbers, if not the majority, of its citizens.

LETTERS FROM THE TRADE ON PARCEL POST.

Signed Petitions from All Parts of the Country Recommended.

To the Editor: Your editorial in the last issue of *The Iron Age* is an admirable presentation of the principal objections to the proposed rural route parcel post, or any other sort for that matter. It also points out the real seriousness of the situation and the necessity of prompt and energetic action by the retail interests of the smaller cities and towns and villages of the country with a view to making clear to the authorities and legislators at Washington their unequivocal antagonism to the projected measure and parcel post legislation generally.

It is up to the hundreds of thousands of merchants in every State of the country to rise in a mighty protest against this monstrous imposition, which would at first cripple and eventually wipe out the business of the smaller places and centralize the trading of the country in a few great cities.

It is, indeed, as you so eloquently point out, time to get busy.

It is time to strike, and strike hard, for the welfare of the home town and against the complete commercial domination of the great centers.

Our retail Hardware associations will, of course, voice their opposition, and embracing, as they do, many thousands of merchants in all parts of the country, this will carry weight.

But I fear this sort of official procedure by itself will hardly avail in view of the very powerful and astute interests, Government and otherwise, which are arrayed in favor of a parcel post.

More effective than any other action, I think, would be the preparation of protests in the form of petitions in every small city, every town and every village of the country, signed by every business interest of these places—every man or woman running a store or catering to the public in any way, for they will all be injuriously affected by parcel post if it becomes a reality. Every one in the town should unite in this effort—the Hardwareman, the grocer, the butcher, the druggist, the dry goods man, the hotelkeeper, the livery man, the doctor, the dentist, the barber, the candy man, the blacksmith, the tinsmith—yes, and the dressmaker and the milliner.

Let a Hardwareman or two in every place get to work and line up their brethren in every branch of business, and put them on official records in opposition, and then forward the document without delay to their Congressman.

Various forms of petition will occur to your readers, but the following is offered in the way of suggestion:

[Town, State], December ..., 1908.

To ..... [Your Representative in Congress.]

We, the undersigned, in business in ..... [town, State], enter our earnest and emphatic protest against the establishment of a parcel post on the rural routes and against parcel post legislation in any form.

We regard the carriage of merchandise in the mails on the rural routes as not only open to many serious objections on the ground of expense and public policy, but desire to emphasize the fact that while it would be greatly to the advantage of the catalogue houses and the department stores of the cities it would be detrimental to our interests and to the business welfare of the smaller communities.

NAME.	BUSINESS.
.....	.....
.....	.....
.....	.....
.....	.....

This form can, of course, be improved, but it will answer the purpose for which it is respectfully submitted by HOME TOWN.

Importance of Individual Action.

To the Editor: Your editorial utterance in the current number of *The Iron Age*, referring to the live topic of parcel post, deserves the thoughtful attention, not only of the Hardware trade, but also of retail merchants in every line of business, and of all students of economic problems. It is to be regretted that so clear, convincing and compact a discussion of the question must be confined in its circulation largely to one class in the business world.

The point I wish to emphasize is that the situation calls for immediate action on the part of individual members of the retail trade. Organized effort is of course effective; the various associations through their able and faithful officers are doing splendid work, the results of which may be clearly seen in the past history of the agitation for a merchandise post, but the strongest and most telling arguments which can be laid before our na-

tional legislators are the individual expressions of the substantial retail merchants throughout the country, who do not want even a rural parcel post, and regard it as inimical to their interests.

Your editorial will doubtless prove effective in stimulating many Hardwaremen to take the steps that you suggest. They in turn should be quick to pass on the call to local merchants in other lines of business whose jeopardy from legislation favorable to parcel post is quite as great as that of the Hardwaremen themselves.

NEW ENGLAND.

Lining Up the Crossroads Merchants, and Even the Mail Carriers, Against Parcel Post.

To the Editor: I heartily indorse what you say on parcel post in this week's issue of *The Iron Age*, and am very glad to see you taking the matter up in this manner. I think there are two classes of people that we can interest if they are reached with the proper class of literature. First is the merchant in the very small country towns and at the cross roads. These men would be entirely put out of business should the parcel post be established, and I do not think it would take very much argument to put them to work against it. They are generally influential men in the settlements, and if we can get them lined up with us they would exert quite a lot of influence for us.

The second class is the mail carriers themselves. There was a convention of these men in my town yesterday, and on my presenting the case to them and showing them where the parcel post would turn them into express deliverers and also use an immense amount of Government money, thereby making it less probable that the Government will go into the road building business, in which they are most interested, I had them almost unanimously with me before the adjournment of their meeting, and I believe if it was properly presented to all of them throughout the country we could get them with us in opposition to the parcel post.

SOUTH CAROLINA.

Merchants as Individuals Should Act.

To the Editor: Your suggestion that the retail merchants of the country should immediately express themselves on the parcel post question is very timely. I believe that one of the most effective ways this can be done is for the individual merchant to write directly to his Congressman and to the Postmaster-General. I am in touch with several local associations of merchants and shall endeavor to have them take this matter up at once, and not only send copies of resolutions to the department, but also urge their members to write individually.

Within the past year I have met in conventions business men from 28 States, representing thousands of retail merchants, and without an exception they have passed strong resolutions against parcel post. They oppose these measures not only because such laws would seriously injure the retail merchant in all the towns and villages of the country, but because anything that will tend to take business from the rural communities and concentrate it in the large cities is detrimental to the future welfare of the nation as a whole. This fact is so patent that it is not necessary to dwell on it for a moment. You have made this clear in your editorial in *The Iron Age* of November 26. It has been shown over and over how such a parcel post law would hasten the downfall of the villages, help to depopulate the country towns, destroy the home market of the farmers and deprive them of the pleasant, wholesome society of village life.

There is no demand for even a local parcel post, which if once inaugurated would, through the subtle influences of the great catalogue houses, soon be extended to cover the entire country. The farmer does not want it. He does not want to be shut in on the farm and have everything brought to him, so he will have no need to go to town. He and his family need a live, prosperous village near them and they want to go to town frequently for the recreation and for the educational and social advantages they derive from keeping in close touch with village life. No greater injury could possibly be done the farmer than to destroy these country villages. He and his family need the society, the churches and the schools of these prosperous country towns, wherein are born and reared the very highest type of American citizenship. You have truly said in your editorial that "the farmer surrounded by decadent towns is a partner in their misfortunes."

If our government is so solicitous for the welfare of the farmer let it build better roads, so he can get to and from the farm with less time and expense; but if a parcel post is put in operation it will ultimately result in defeating the very object sought to be obtained.

PENNSYLVANIA.

Passage of Bill Would Nullify All That Has Been Won in Fight Against Catalogue Houses.

Extract from letter from a North Carolina Hardwareman: The passage of this bill would undo at one stroke all that has been accomplished in our fight against catalogue houses, which, as every one knows, have done more to demoralize business, without any corresponding benefit to consumers, than any other one thing that can be mentioned. They are a constant drain upon our resources and pay no taxes in support of our schools, churches or county and State government.

I would like to see your editorial widely distributed, and I should be glad if I could place a copy of it in the hands of every merchant in my State.

[NOTE.—*In view of numerous requests from merchants for copies of the editorial which appeared in our last issue giving a summary of the principal objections to a merchandise parcel post, we have prepared reprints for distribution, which we shall be pleased to furnish to those who desire to make use of them.*]

THE AMERICAN IRON & STEEL MFG. COMPANY, with plants at Lebanon and Reading, Pa., has recently issued an elegantly printed catalogue of more than 100 pages in which the principal lines of its manufacture are described. The company gives special attention to the production of refined Bar Iron, Bolts, Nuts, Rivets, Spikes and Forgings for railroad, telegraph and telephone work, of which they carry a stock ready for shipment approximating 16,000 tons. The early pages of the catalogue are embellished with views of the general offices, of the central, west and east works at Lebanon and of the Reading works at Reading. Eighteen pages at the back are devoted to a very comprehensive telegraph code.

THE long established and successful Hardware business of Acer & Whedon, Medina, N. Y., has lately been purchased by Henry Curtis of Springville, N. Y., and D. W. Wilson of Buffalo, who will continue at the old stand under the style of Curtis & Wilson. For the past few years the business has been confined to Shelf Hardware, Stoves, plumbing and heating. It is the intention of the new proprietors to extend the business to its former basis, carrying a full line of Shelf and Builders' Hardware, Tinware and Stoves. It is also contemplated to add a staple line of Agricultural Implements.

THE TWICHELL IRON COMPANY, Kansas City, Mo., has lately issued a folder in which merchants are cautioned against the purchase of light weight Metal Roofing and Siding Materials, Eave Trough and Conductor Pipe. The company suggests that it will pay the trade to look carefully into the matter and weigh and measure materials of this character.

Anderson & Co., Colton, S. D., recently suffered an entire loss by fire of their $12,000 stock of Hardware, Stoves, Sporting Goods, Furniture, &c., upon which there was insurance of $9000. The firm will not start in business again for some time.

A. R. Titus has purchased the stock of the Blairsburg (Iowa) Hardware Company, which will be removed to Olathe, Colo., where the owner will engage in business.

Holiday Trade in the Hardware Store.

HOLIDAY POLICY OF THE FOWLER & SELLARS COMPANY.

As the result of several years' cultivation the Fowler & Sellars Company, White Plains, N. Y., has built up a large and profitable business in holiday lines. The company's policy has been to emphasize the desirability of practical every day articles as holiday presents, goods that sell all the year around, the stock of which is greatly increased for the Christmas season. No Toys or goods which are merely ornamental in character enter into the stock purchased by the company for the holidays.

Christmas Window Display of Fowler & Sellars Company.

Christmas Goods to the Front.

An effort is made to get the most attractive goods well to the front of the store at Christmas time, arranged so as to show off to the best advantage. They are given sufficient space on stands or counters so as not to appear crowded and to permit customers to examine them critically.

Newspaper and Other Advertising.

To remind the public that a large, select and varied stock of holiday goods is carried by the company more advertising space is taken in the local papers, and attractive circulars are mailed and otherwise distributed to customers and the public in general. But this advertising is ably seconded by the

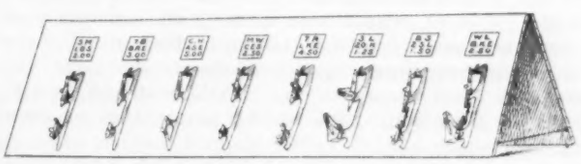
Attractive Show Windows.

In Fig. 1 is shown the arrangement of the company's window for the holiday season of 1907, before moving into a new building. The background of the right hand window was formed of a large "Merry Christmas" banner, above which were festoons of holly and four green wreaths with red bells in the center. There was also a large red bell in the center of the window. In arranging the window a space was left under the banner and above the partition or panel dividing the window from the salesroom, which was 30 in. high. This opening was left so that a clear view of the interior of the store could be had from the sidewalk, while the street could be seen from the inside of the store. Skates were sampled at the top of the panel. Elevated and back of the banner was a line of Sleds, arranged to show the bright painted tops. On the right side of the window was a toboggan. In front of the panel were Fire Sets, Lamps, Electric and Gas Portables, and on steps were placed Chafing Dishes, Five o'Clock Teas, Cutlery, Silverware, Candelabra, Manicure Sets, &c.

Facilitating the Sale of Skates.

Skates were displayed at the top of the panel by a simple and effective arrangement on boards, hinged at the top and spread at the bottom, as shown in Fig. 2. The boards were 16 in. wide and about 10 ft. long. Each kind of Skate in stock was sampled on both sides of the boards, one each on a brass cup hook, and the boards were stood on a set of shelves located in the store, just back of the panel, which were high enough so that the Skates on one side of the boards could be seen from the sidewalk and the other side from the salesroom. Above each Skate was a label marked with the number, cost and selling price, the selling price figures on the street side of the boards being large enough to be easily read from the sidewalk.

Beginning at the left end of the board will be seen three styles of Hockey Skates, followed by three kinds of Rink Skates, and next to these two styles of women's Skates. As a result of this grouping of various styles of Skates purchasers were enabled to see the same Skates sampled and priced on the boards inside the store as they had seen from the sidewalk. The samples could easily be examined by the customer and a selection made, after which a box containing the right size could be taken from the shelves below, where the stock was kept. This arrangement obviates the necessity of opening a number of Skate boxes to satisfy the curiosity of the customer, and does away with an indiscriminate handling of the stock.



Method of Sampling and Displaying Skates.

The left hand window was also enlivened by decorations of greens, and featured Guns, Hunting Clothing, Football Goods, Safety Razors, Revolvers, Thermometers, Leather Novelties, Cigarette and Cigar Cases, Pocket Mirrors, Change Purses, &c.

Goods Featured During the Holidays.

The following is a list of articles which the company has found profitable to include in the stock of goods for the holiday trade:

FANCY ARTICLES.
Leather Novelties.
Brass Smoking Sets.
Manicure and Toilet Sets.
Thermometers, &c.

FIREPLACE GOODS.
Andirons.
Fireplace Screens.
Fire Sets.
Grate Bellows.
Grates.

HOUSEHOLD GOODS.
Bird Cages.
Carpet Sweepers.
Call Bells.
Carvers.
Table and Pocket Cutlery.
Crockery Jardinieres.
Urns.
Umbrella Stands.
Feather and Fancy Dusters.
Brown and White Stone Ware.
Lamps.
Gas and Electric Portables and Electroliers.
Chafing Dishes.
Five o'Clock Teas.
Coffee Percolators.
Tea and Coffee Pots.
Baking and Fern Dishes.
Glass and Ornamental Candlesticks and Shades.
Candelabra.
Cut Glass.
Sterling Silver and Silver Plated Ware, flat and hollow.

KITCHEN ARTICLES.
Bread Boxes.
Cake Boxes.
Clothes Wringers.
Coffee Mills.
Denatured Alcohol Cooking Stoves and Smoothing Irons.
Family Scales.
Gas Heaters, Ranges and Hot Plates.
Oil Heaters and Ranges.
Flour Bins.
Meat Choppers and Presses.
Roasting Pans.
Aluminum and Enameled Ware.

SPORTING GOODS.
American Flags.
Automobile Lunch Basket Sets for two, four and six persons.
Fishing Rods and Reels.
Fishing Tackle.
Football Goods.
Foot Warmers.
Game Bags.
Gun Cases.
Guns.
Hockey Goods.
Hunting Axes and Knives.
Hunting Clothing.
Revolvers.
Childs' and Bob Sleds.
Sleigh Bells and Chimes.
Skates.
Skis.
Snow Shoes.
Toboggans.

The Delivery of Christmas Gifts

was arranged for by storing purchases on the second floor, to be sent out on Christmas eve or at any previous time that the buyers might designate. On the evening before Christmas of last year two wagons were kept busy up to 11 p.m. delivering presents.

CHRISTMAS SHOPPING SCENE IN THE SHOW WINDOW.

BY F. B. M.

AN animated Christmas shopping scene may be arranged in a store window in the following manner: Two boxes are made of light lumber, about 6 in. deep and 15 in. wide, 3 ft. in length, or as long as the window will permit. Set window glass in the openings of the boxes about ¼ in. back of the edge, either by grooving out a narrow channel or by driving wire brads in the wood to hold the glass in place. Two panes of glass may be set end to end, if glass in stock is not long enough to reach the entire length of each box. The two boxes, with the glass fronts facing each other, are designed to represent buildings on either side of a street, in perspective.

Painting the Glass.

Paint the glass with transparent paint in imitation of the fronts of buildings. The paint may be either water colors or colored inks, mixed with sufficient gum arabic to make it adhere to the glass. The outline of the show windows, doors and the window sash in the second and third stories of the buildings should be outlined in black only, thus leaving clear panes of glass through which electric lights, dropped through holes in the tops of the boxes, will shine. Red ink mixed with gum arabic will answer to represent brick walls surrounding the small windows above the first story. The bricks should be outlined with white ink, with a fine brush, over the red ink, in imitation of mortar, as the brickwork will also be transparent and will show off to advantage with the light showing through. A snow sky effect should appear above the buildings.

The Perspective Effect.

The buildings should be painted in perspective, making the stores nearest the front the largest and gradually diminishing in size toward the rear, where the end of the boxes will come quite near together. The windows of the largest stores on each side of the street may have the word "Hardware" painted on them. Granulated sugar may be sprinkled on the floor of the window to represent snow.

Other Accessories.

Christmas shoppers can be represented by dressed dolls, many appearing on the sidewalks giving life to the scene, the electric lights in the boxes helping to show them off. On the widening street, near the plate glass window, a show card reading as follows may be laid down:

THIS IS THE PLACE
FOR
HOLIDAY SHOPPING

A snowstorm can be represented by cutting white tissue paper in pieces about ¾ in. square. These are crumpled up and coated with a little paste and a sprinkling of "Snow Sparkle," to imitate snow flakes. These are strung with needle on black silk thread about 1½ in. apart. The strings of snow flakes are suspended from the top frame of the plate glass window, in front of the scene, and should be hung so that the flakes will alternate, the strings being close together and reaching from the top to the bottom of the window. The strings will then be free to blow against the plate glass, motion being imparted to the sparkling flakes by an electric fan placed back of the exhibit, so that the air will act gently upon the suspended flakes, giving the appearance of a driving storm, causing each flake to sparkle in the sun or electric light.

The average window dresser is probably enough of an artist to carry out this idea, with the information already given of materials and methods employed, and could probably elaborate features which will increase the attractiveness, according to the size and extent of the show window at his command.

HOLIDAY GOODS, ESPECIALLY TOYS.

BY A TEXAS MERCHANT.

MANY regular goods need but little argument to bring them in line for holidays. Cutlery, Nickel and Silver Plated Ware, both Hollow and Flat, Aluminum and Enameled Ware, Plain, Fancy and Fine China, besides a great many household novelties, should be borne in mind and judiciously displayed. Tools of all kinds, Boys' Wagons, Velocipedes and Tricycles are also in order.

Toys an Attractive and Profitable Line.

In addition Toys are an attractive line. Many Hardwaremen hesitate about putting in a line of Toys. Some think it takes away from the dignity of the store, while others think that the accompanying work and worry are too great. For those who consider it too much work I suggest that they do not tackle Toys.

If you are one of push, buy liberally in the Toy line. Display the goods well and marked in plain figures. You are going to have a busy store, and time given to answering questions about prices can be saved by the use of price cards.

To my mind there is no one line that will add as much to the popularity of a store as a line of Toys judiciously bought, priced and displayed.

Transformation in the Store.

For the holiday trade a complete change of the store is desirable. This can be accomplished by rearranging the displays in the showcases and on the racks and shelving, bringing all sorts of articles suitable for gifts into prominence at the expense of the regular line of goods. A good idea is to make the interior of the store reflect as much as possible the holiday cheer.

Change Window Displays as Often as Possible.

The best advertisement of what you have to offer in the holiday line is your show windows. Trim them so they can be changed often, if possible every 48 hr., and by all means couple the articles shown with price cards.

Remember, no matter whether times are prosperous

or otherwise, people always manage to have a few pennies laid aside for the holidays.

THE J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., is, as usual, offering the trade who handle its line an assortment of newspaper electrotypes for Christmas advertising. The cuts are mortised to allow space for merchant's name, &c., and are of the same designs as the company's magazine advertisements, a fact which serves to link the merchant's announcement with the manufacturer's general publicity campaign. An attractive booklet has been sent out referring to special features of the Stevens line, especially in connection with the holiday trade, and illustrating a number of the electrotypes furnished on application.

THE NORVELL-SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo., is prepared to furnish circulars, 24 x 36 in. in size, printed on both sides, showing more than 100 items of Christmas specialties that should find ready sale for the Hardware trade. This circular has been got up with a view to encouraging the Hardware merchant to go after holiday business energetically. The company suggests that two of these large circulars might be put in a show window with a sign to the effect that the merchant can supply any of the goods named on the circular at the prices given. The prices in the circular are so arranged that the merchant gets a 50 per cent. discount, which secures for him a nice profit and one that would justify him in ordering the goods by express if necessary. The articles illustrated in the circular embrace Lamps, Clocks, Lap Robes, Watches, Tool Cabinets, Pocket Knives, Carvers, Bicycles, Morris Chairs, Rocking Chairs, Toy Banks, Sewing Machines, Roller and Ice Skates, Air Rifles, Guns, Sleds, Coasters, &c.

THE November number of *Hardware Hints*, issued by the Logan-Gregg Hardware Company, Pittsburgh, Pa., is appropriately a holiday number, and in its pages many of the goods which are popular and salable during the holiday season are illustrated and listed. These include Razors and Safety Razors, Scissors, Childs' Sets, Clocks, Watches, Ice and Roller Skates, Watch Fobs, Boxing Gloves, Indian Clubs and Dumbbells, Express Wagons, Coasters, Velocipedes, Suit Cases and Traveling Bags, Carriage Heaters, Household Hardware, Tool Chests and Cabinets, &c. The list prices in the catalogue are the company's own and the discount from them to merchants is 50 per cent. The company also offers to send without charge with every order for holiday goods of reasonable amount, say, $25 or more, some special holiday advertising matter, consisting of a display banner for the outside of store, and one each of two different kinds of interior or window display posters.

Here and There in the Hardware Store.

BY SAMUEL MASTERS.

X.—ATTITUDE OF THE HARTMANS.

I HAVEN'T said much about Hartman, Jr.'s interest in my work or his help in it. I kept in very close touch with him, however, or rather he kept closely in touch with me. It was his practice to make a daily trip through the store after disposing of the morning mail and he made my desk one of the stations of his round. I tried to have something to show him as an indication of progress, and there were very few details that escaped him. He seemed to be particularly interested in the list of accredited firms, and as fast as I had a bunch completed and any sales shown upon the ledger transferred to the back of the cards he looked them through, commenting upon the absence of orders or the amount of trade secured. It soon became evident to him that two salesmen were not sufficient to cover the ground, and he and I made a careful canvass of the force for good sales timber when Mr. Martin should awake to the fact that he must cover the ground more thoroughly.

A Commanding View.

My desk was on a dais at the rear of the store. At one time the city manager had had his desk there, but upon his advent Mr. Martin decided that he ought to be upon the floor among his clerks and customers and had his desk placed in the front of the store near one of the windows, with a railing around it to keep at a proper distance the Refrigerators, Lawn Mowers, Ranges and other large articles set out for display. From my desk a clear view of the floor below could be gained, and Hartman, Jr., and I looked down upon the men at their work and tried to determine their fitness for outside work.

Disabilities.

One man lacked initiative. He worked well under definite instructions, but seemed to have no power to reason out matters or go an inch beyond the course laid down. Another was too argumentative. A third took little interest in his work. A fourth was untidy in appearance. A fifth murdered the English language every time he spoke. The Builders' Hardware man and the Cutlery clerk had experience in their own lines only. One clerk was an old man who helped Peter Hartman take down the wooden shutters on the first morning the store opened, and was now virtually a pensioner of his sons. In most cases there was some disabling condition.

I told Hartman Junior that I had not realized what a lot of ineligibles the city store contained. He looked at me in some surprise.

"They're a pretty good set, Sam," said he. "They were not hired for their ability as trade solicitors, and have their limitations just as you and I have. It isn't everybody who can go out and buck up against a lot of buyers with success. It is one thing to sell goods over the counter to men who come in with the intention of buying and a very different one to go to a man who is thinking of something else and endeavor to interest him in what you have to offer."

Selections Made.

In the end we decided that three of the men on the force would do. They had had no experience in selling, even in the store, but they knew the stock thoroughly, had a pretty fair idea of the prices to charge and were industrious. One was Morgan, a stock clerk; one was Kelly, the cellarman, who had charge of the orders for fittings for out of town customers, and the other was the houseman, who cared for the orders for one of the city salesmen. The man last named was the one first chosen, replacing one of Mr. Martin's two men, who objected to furnishing reports of his daily movements.

Hartman Senior's Visits.

Hartman Senior had a disconcerting fashion of dropping in upon me occasionally. Upon his first visit I told him as little as possible about my work, wishing to avoid any possible complication of Hartman Junior's plans; but Junior told me to be as frank as possible with his brother and to tell him all he would hear about the work in hand. His second visit came at the time when the Blue Book was at the hight of its popularity, and he listened with seeming interest when I told him of the lining up of the stock when the book was compiled and of some of the new business that could be traced to this source. Later when Mr. Clark told him of the card list of prospective customers he came again to my desk and spent some time in looking the list over. He found therein the names of a number of firms who had been his personal customers in the early days of his service and noted that they bought nothing now. He took a drawer of the cards down to the desk of the city manager, Mr. Martin, and from my elevated dais I could see that an animated discussion of the condition as shown by the cards resulted. When Mr. Martin returned the cards he told me that Hartman Senior had exhorted him to make all possible use of the data for the extension of business, and had offered to see personally two or three of his old customers and attempt to regain their trade.

(To be continued.)

AUSTRALIAN NOTES.

MELBOURNE, October 19, 1908.

THE spring season is with us and trade is fairly good. Country accounts have been a little backward of late, but magnificent spring rains, which have fallen especially over our wheat belts, have dispelled any anxiety on the part of the wholesalers. A good harvest is assured, and indeed a record one is quite probable. From the above you will gather that speculative business is entirely absent, yet the year will compare more than favorably with the corresponding period of 1907. Standard lines of Australian requirements are in steady and ever-increasing demand, and the commercial community as a whole has never been in a more thoroughly satisfactory position than it is to-day.

Harrold Colton & Co., Ltd., Adelaide, have taken possession of the new building erected by them in place of the one destroyed by fire some 18 months ago. The new building has been specially designed to meet the requirements of their business as general merchants. It has a frontage of 94 ft. on Currie street, with a depth of 212 ft.

Alfred Shaw, one of the fathers of the Victorian Hardware trade, died at Perth, Westralia, quite recently. He founded the firms now known as Harvey Shaw & Co., of Melbourne, and Alfred Shaw & Co. of Brisbane. He was a heavy loser in the Melbourne land boom, and latterly had been in the land agency line in Westralia.

The Australian Hollowware Company is the title of a new firm with works at Williamstown, near Melbourne. Britain has so far supplied this country with the bulk of its hollowware requirements, although during the last decade Germany has made a strong bid for and captured a fair share of the trade.

Australian traders are making a strong and persistent effort to educate the public to purchase Australian made goods and so support local industry. This effort has met with a fair measure of success, and the patriotic spirit has now to be reckoned with, though not in any great degree as yet. Still, it is a factor to aid Australian industry, and every new departure and each new factory are sure of sympathetic consideration so long as the goods are well made.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM T. A. PADEN, who has engaged in the wholesale and retail business in Carr, Colo., handling Hardware and Lumber.

FROM J. V. A. FRATES, Sebastopol, Cal., who has added Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting and Athletic Goods to his plumbing business.

E. C. ATKINS & Co., Indianapolis, Ind., are issuing a series of talks on salesmanship addressed to "Salesmen Who Want More Salary." The talks are issued in convenient circular form and are attractively gotten up and brightly written. Although of course their main object is to increase the salesman's interest and effort in the sale of Atkins Saws, they are also calculated to inculcate many interesting and suggestive ideas regarding the fundamental principles of salesmanship and business success.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

WM. E. PRATT MFG. COMPANY, 91 Lake street, Chicago, Ill.: Catalogue relating to Clevises, Felloe Oilers, Malleable Iron Wrenches, Malleable Fifth Wheels, Oar Locks, Automobile and Lifting Jacks, Belt Hooks, Wire Mats, Garment Hangers, Cow Bells, Hog Rings and Ringers, &c.

CENTRAL STAMPING COMPANY, New York: Catalogue No. 25, illustrating a full line of Sterling-Aluminum Enameled Ware. In addition the company manufactures Pressed, Stamped, Pieced and Japanned Tinware and Galvanized Ware.

CHAMPION SAFETY LOCK COMPANY, Geneva, Ohio: Catalogue No. 11, showing Floor Hinges, Kick Plates, Door Holders, Mortise Door Bolts, Door Stops, Sash Locks, Sash Lifts, Drawer Pulls, Cupboard Turns, Casement Window Adjusters, Spring Hinges, &c.

CLARK-HORROCKS COMPANY, Utica, N. Y.: Catalogue covering the company's complete line of Fishing Rods and Tackle, including Reels, Baits, Spoons, Lines, Leaders, Flies, Hooks, Nets, Fishermen's Accessories, &c.

KNAPP ELECTRIC & NOVELTY COMPANY, 511-513 West Fifty-first street, New York: Catalogue relating to Fans, Motors, Electrohits, Electrical Questioner, Electric Trains, Trolleys and Tracks, &c.

BEST REGISTER COMPANY, Milwaukee, Wis.: Catalogue describing Registers and Ventilators, with faces of cast iron and boxes of sheet steel.

WASHINGTON CUTLERY COMPANY, Milwaukee, Wis.: Pamphlets illustrating the Village Blacksmith Hand-made Butcher Knives and Tools.

JOHNSTON HARVESTER COMPANY, Batavia, N. Y.: Catalogue relating to Binders, Mowers, Reapers, Hay Tedders, Steel Rakes, Corn Binders and Disk Harrows.

BUTLER BROTHERS, Chicago, New York, Minneapolis and St. Louis: "Our Drummer" catalogue for December, containing holiday goods, as well as a large variety of other goods suitable for the Hardware trade.

The Luther Hand Grinder.

In an illustrated description printed in these columns in the issue of November 12 of the new grinder put out by the Luther Brothers Company, Milwaukee, an error was made which has led to misapprehension as to the size of the tool. It was stated that when packed in a 12-in. case the tool weighs 120 lb. The statement should read when packed 12 in a case the weight is 120 lb., or, in other words, the gross weight of each machine is 10 lb. instead of 120 lb., as was indicated in the article.

Steel Tapes That May Be Instantly Read.

The Lufkin Rule Company, Saginaw, Mich., and 280 Broadway, New York, has notably improved its line of steel measuring tapes by the adoption of a new system of marking for instantaneous reading. A part of the tape thus offered is reproduced herewith somewhat reduced in size. Commencing with the 2-ft. section of the tape, the foot number of the preceding section is repeated in smaller but plain numerals in every inch interval but the last of each foot for the entire length of the tape, or a total of 539 times on a 50-ft. tape. This innovation not only saves time but markedly reduces the chance of error. It is the intention of the company to mark all of its steel measuring tapes according to this method in the near future.

New System of Marking Steel Measuring Tapes.

The Bartell Vest Pocket Safety Razor.

The Cora B. Bartell Vest Pocket Safety Razor Company, 406 World Building, New York, N. Y., is offering the vest pocket safety razor shown in the accompanying illustrations. The razor, which was designed by Mrs.

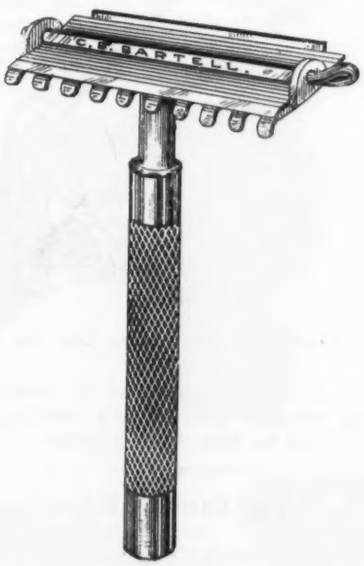


Fig. 1.—The Bartell Vest Pocket Safety Razor.

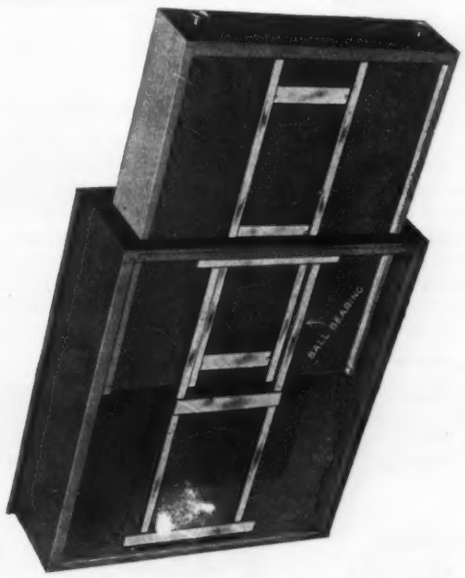
Bartell, is so constructed that the blade is secured by a bar holding it viselike to avoid flopping. When the blade is put in place the pressure exerted by the bar gives a natural concave to the blade. The full use of the blade

Fig. 2.—The Bartell Safety Razor with Twelve Blades in Leather Vest Pocket Case.

is thus given, so as to shave in the corners of the mouth and across the face. The blade is placed in position backward, avoiding injury to the edge. The handle screws to the back of the blade holder when in use. No stropping or honing is required.

Reliance Ball Bearing Drawer Slide.

The Reliance Ball Bearing Door Hanger Company, 1 Madison avenue, New York, has just put on the market the patented ball bearing drawer slide one view of which is given herewith, and which is in addition to a somewhat similar device for installation on sides of drawers for the same service. Both styles of slides embody the same mechanical principles that have been the feature of the Reliance ball bearing door hangers. The slide under consideration consists of four grooved steel bars, two stationary, while the other two move between them on steel balls fitted into the grooves, there being a thin intervening steel plate with holes that keep the steel balls on each side always in proper position and at the same uniform distance apart. The slide mechanism is screwed to the bottom of the drawer in such manner as to require but little room to accommodate it, and the slide can be readily attached to drawers not made especially for it. This construction allows the



Reliance Ball Bearing Drawer Slide, Partly Open.

drawer to be opened four-fifths of its length and the drawer will not pinch or bind, empty or full, at any point, a slight push at any place on front end easily closing it. It is out of sight and makes possible the carrying of any reasonably heavy load with an easy movement. It is especially commended to the trade, architects, contractors and builders making a specialty of the interior fittings, including bank and office furniture and fittings, store and merchandise showrooms and high grade cabinet work, fine residential and public buildings, &c., where many easy running and durable drawer slides are required.

The Elmore Solid Drop Forged Screw Driver.

The Elmore Tool Mfg. Company, Hartford, Conn., is putting on the market a screw driver of which two views are presented herewith. The entire handle and ferrule are drop forged from the best quality of steel. On all sides of the handle are ribbed edges, designed to overcome large cracks caused by shrinkage of the hardwood scales. The handle is shaped to fit the hand and give a secure grip. The end of the handle is made heavy and flat to permit of hammering and other rough work, the style of both the butt and ferrule end being such as to prevent splitting or cracking the wood scales from rough usage. It is explained that great care is taken in the forging, tempering and polishing of the tool. The driver is made in different styles and lengths of blade, in several sizes of drop forged handles, with both round and square shanks, designed for all kinds of work. The same construction is also carried out in a complete line of solid steel drop forged handled ice picks and chisels.

The Elmore Drop Forged Screw Driver.

The Wizard Adjustable Ratchet Wrench.

The Richards Mfg. Company, Aurora, Ill., is offering the ratchet wrench here shown, Fig. 1 representing the wrench complete and Fig. 2 the various parts. The wrench is adjustable and can be operated like an ordinary wrench, or can be made to ratchet with right or left action by giving the knob in the handle a half turn, which reverses the pawl. It is pointed out that the wrench is especially adapted for use in close quarters and an excellent tool for use in connection with automobiles, engines and machinery of all kinds, and as especially convenient for work around pulleys. When applied to a nut the wrench need not be lifted until the nut is turned as much as desired, so that plated nuts are not marred. The wrench can be operated with one hand. It is made of the best quality drop forgings throughout, surface polished and hardened, and has a mottled finish. All parts are interchangeable. The wrench is 7¼ in. over all and the jaws open 1 in. Other sizes will be added to meet the demand. The wrenches are packed one in a box, one dozen boxes in a case.

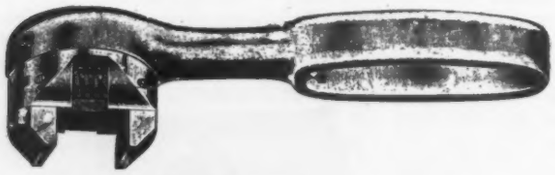


Fig. 1.—The Wizard Adjustable Ratchet Wrench.

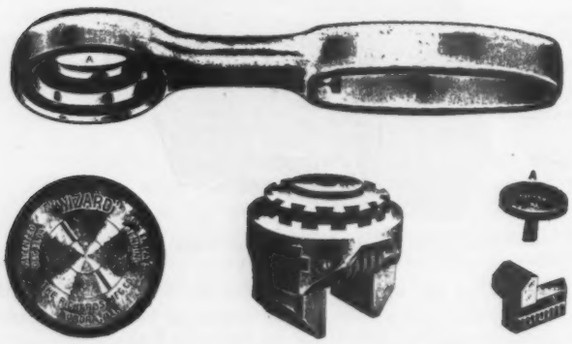


Fig. 2.—Parts of Wizard Adjustable Ratchet Wrench.

Planet, Jr., Disk Hoes.

S. L. Allen & Co., Market and Eleventh streets, Philadelphia, Pa., manufacturers of Planet, Jr., agricultural implements, have added to their line disk plows shown herewith. The single wheel disk hoe illustrated in Fig. 1 is identical with the firm's single wheel hoe, except that two sets of oil tempered disks, three each, take the place of the pair of hoes, and it has a leaf lifter. All the disks may be used at once or two on a side, as preferred. They are adjustable for depth, and to throw to or from the row, as desired. With the leaf lifters the work can be done without danger of cutting off the leaves, obviating injury to the plants. The double wheel hoe, shown in Fig. 2, has all the advantages of the single wheel, and in addition the steel arch permits working crops until the plants are 20 in. high or even higher.

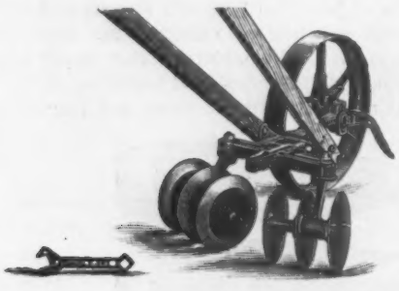


Fig. 1.—Planet, Jr., Single Wheel Disk Hoe No. 18½.

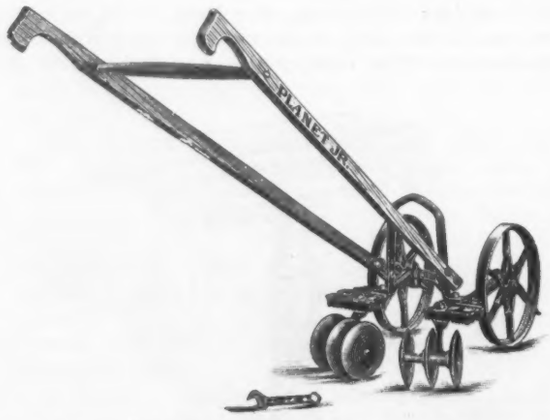
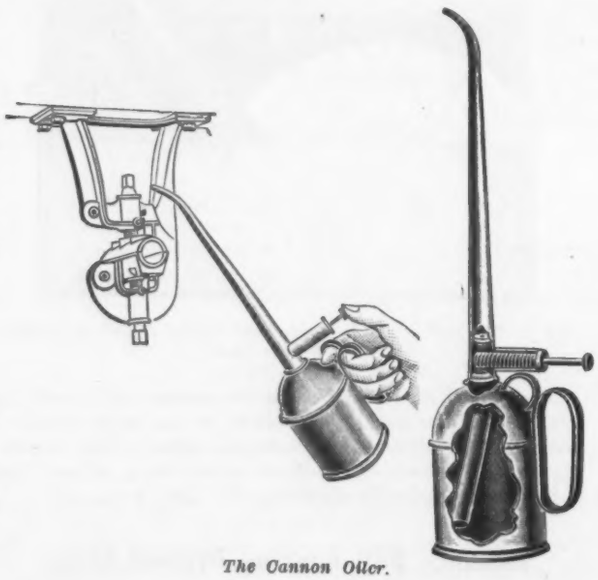


Fig. 2.—Planet, Jr., Double Wheel Disk Hoe No. 13½.

The Cannon Oiler.

The oiler here illustrated is designed to combine convenience, quickness and economy in the distribution of oil to bearings, and is manufactured by R. E. Bloomer, Keithsburg, Ill. The device is supplied with a force pump attachment which affords positive control of the flow of oil through a pump attachment, the mechanism of which is clearly shown in the cut away view. Oil is forced out by an easy pressure of the thumb on the plunger, and since the flow ceases when pressure on the plunger is arrested no oil need be wasted. The force pump is constructed without the use of packing nuts, both valves being separate from the plunger, which is packed with leather, which working in oil, is subject to little wear; however, should occasion require it, the packing may be easily replaced. Should the spout become clogged through use in cleaning out oil cups, presure of the pump will remove such obstacle and start the oil. The cans are made in sizes ranging in capacity from ½ pint to 1 quart, with extreme hight of 9¼ to 26 in. and spouts 6 to 20 in. in length, and are finished in tin or brass.

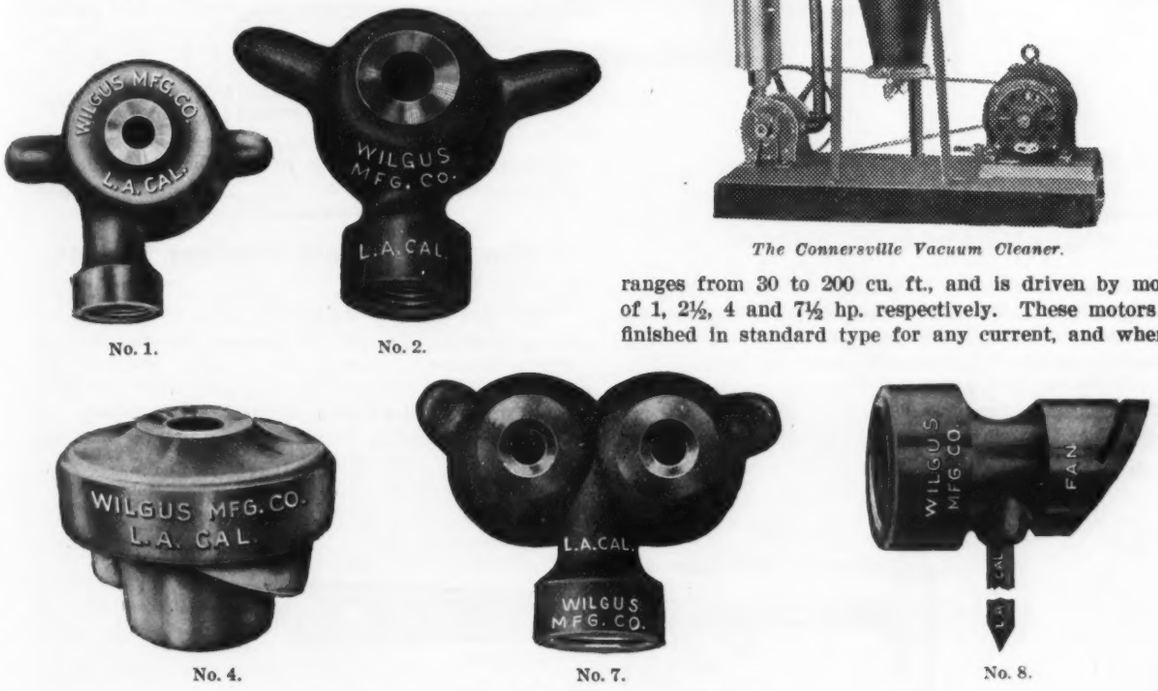


The Cannon Oiler.

The stock and business of the Weber Hardware Company, Minot, N. D., has been purchased by E. C. Fritz & Co.

The Wilgus Lawn Sprinklers.

The accompanying illustrations represent a portion of the line of lawn sprinklers offered by L. C. Pond Company, 322 East Third street, Los Angeles, Cal. The No. 1 sprinkler for ¾-in. hose will throw a circular spray with 35 or 40 lb. pressure, distributing the water equally over a circle 35 ft. in diameter. A No. 3 sprinkler of the same construction is made for 1-in. hose. Sprinkler No. 2 for ¾-in. hose, throws a circular spray of water with a center stream to secure a fountain effect. The spray is referred to as being absolutely circular, having two openings to the chamber in the sprinkler. Sprinkler No. 4, for ¾-in. pipe—a No. 5 being made for ½-in. pipe—produces the same fountain effect as No. 2 with center stream. These two sprinklers are designed to be screwed on pipes in fountains, or to be placed on uprights flush with the lawn on a line of pipe. The Lawn Twin sprinkler, No. 7, for ¾-in. hose, throws a circular spray, well blended, making it impossible to have a dry center in the area covered. Sprinklers No. 8 for ¾-in. hose and No. 9 for 1-in. hose, are known as the Fan sprinklers. This style is exceptionally well adapted for a narrow strip of lawn or to sprinkle up to a straight edge or square side. The entire line of sprinklers is made of noncorrosive white metal and all threads are tapped out instead of being cast.

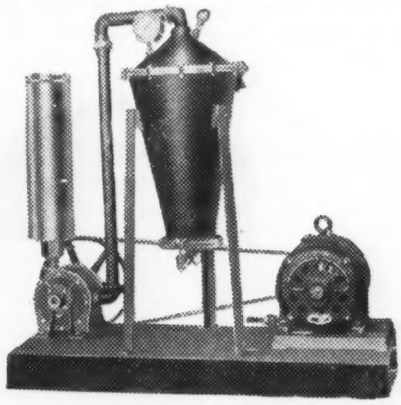


No. 1. No. 2. No. 4. No. 7. No. 8.

The Wilgus Lawn Sprinklers.

The Connersville Vacuum Cleaner.

A recent addition to the line of rotary pressure blowers made by the Connersville Blower Company, Connersville, Ind., is the vacuum cleaner here illustrated. This machine is compactly built and simply constructed, so that it may be easily operated by any person where electric current is available. It is driven by a small electric motor mounted on a common base with the dust separator and pump. The efficiency of the entire equipment rests chiefly with the pump, which is of the sliding vane rotary type and has capacity for maintaining a vacuum of 10 to 15 in. mercury. The pump is provided with an oil separator and muffler which deadens the sound of the machine and strains and returns the oil to the pump to be used again. Dust is drawn by vacuum into a conical cast iron dust collector occupying a central position between the pump and motor. A screen within the collector prevents the passage of dust and dirt into the pump, this receptacle being so arranged as to be easy of access for the removal of dust and cleaning of the screen. Light pliable noncollapsible hose is used for the attachment of the operating handle which carries the various tools and appliances necessary for sweeping and cleaning; this handle is fitted with an observation glass through which the passage of dust particles may be viewed. The machine is made in four sizes, A, B, C and D, whose displacement capacity of air per minute



The Connersville Vacuum Cleaner.

ranges from 30 to 200 cu. ft., and is driven by motors of 1, 2½, 4 and 7½ hp. respectively. These motors are finished in standard type for any current, and when so desired the machine can be equipped with gasoline engine motive power.

Enterprise Electrically Driven Special Cutting or Chopping Machine.

The electrically driven cutting or chopping machine illustrated here, made by the Enterprise Mfg. Company of Pennsylvania, Philadelphia, Pa., is especially adapted for cutting tough and fibrous substances, such as vanilla beans, &c. It can be furnished with ½ or ¾ hp. direct current motor or ½-hp. alternating current motor. The chopper is detachable, which allows easy access to the working parts for cleaning, &c.

Enterprise Electrically Driven Special Cutting or Chopping Machine.

The Leader Pipe Wrench.

The Ripley Pipe Wrench Company, Ripley, N. Y., J. A. Jochum Hardware Company, 105-107 Chambers street, New York, sole representative for domestic and export trade, is manufacturing the Leader pipe wrench, here illustrated. It is made in No. 1, 7½ in.; No. 2, 9 in., and

The Leader Pipe Wrench.

No. 4, 15 in., lengths, the gripping capacities of which are ⅛ to ¾, ⅛ to 1 and ¼ to 2 in., respectively. Patterns are being made for 10, 18 and 24 in. sizes, which it is the intention to market in the near future. Some of the features of this wrench, as referred to by the manufacturer, are as follows: Simplicity and few parts; ability to grip material firmly without lost motion; releasing immediately when pressure is removed without locking; threads on movable jaw guaranteed not to strip or burr, and readily replaced when dull or worn; hooks and jaws made of best quality of carbon steel, drop forged, case hardened and polished and so designed and constructed that the object is gripped with equal force, irrespective of the diameter of pipe. The handles are malleable iron, both nickel and japan finished, and especially proportioned for strength and durability, one of the results being to maintain the line of resistance constantly through the center of handle, thereby increasing the leverage and preventing side strain. The manufacturer suggests that a 4-ft. length of pipe can even be safely slipped over the handle of the 15-in. wrench for additional leverage. The stock or handle is formed with shoulders and provides a support for the swinging jaw pivoted between the two parts by riveting. Within the aperture the operating knurled nut is supported and it engages the threaded extension, thus employing to full capacity the jaw distention. Each wrench is put up in a neat double pasteboard box.

The K. & B. Tack Hammer No. 946.

The tack hammer shown herewith, drop forged in one piece, is being put on the market by the Kilborn & Bishop Company, New Haven, Conn. The hammer is made solid and adapted to any light work for which a light, strong tool of this character is required. Small nails can be started with the claw and then caught in the keyhole shaped slot in the handle to be drawn out straight. The slot also provides an opening for hanging the hammer up. The goods are finished in a new ebonized dull black, with the ends of the heads polished. The hammers are 10 in. in length, weigh 8 oz. each, packed one-half dozen in a box, and are designed to retail at 25 cents.

The K. & B. Tack Hammer No. 946.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—	℔ gal. bbls.
Linseed, Western, Raw	.47 @48
State, Raw	.47 @48
City, Raw	.48 @49
Boiled, 1¢ ℔ gal. advance on Raw.	
Raw, Calcutta, in bbls	.70 @..
Lard, Prime, Winter	.73 @76
Extra No. 1	.51 @52
No. 1	.49 @50
Cotton-seed, Crude, f.o.b. mill	.30 @30½
Summer Yellow, prime	.38¼@38¾
Summer, White	.41½@42
Yellow Winter	.47 @48
Tallow, Acidless	.58 @59
Menhaden, Brown, Strained	.34 @35
Northern Crude	.27 @30
Southern	.23½@..
Light Strained	.34 @35
Bleached Winter	.36 @38
Ex. Bleached Winter	.38 @39
Cocoanut, Ceylon ℔ lb	6½@ 6¾
Cochin ℔ lb	7¼@ 7½
Cod, Domestic, Prime	.38 @40
Newfoundland	.40 @42
Red, Elaine	.39 @42
Saponified ℔ lb	6 @ 6¼
Olive, Yellow	$1.15@$1.35
Neatsfoot, Prime	.55 @58
Palm, Lagos ℔ lb	5¾@ 6

Mineral Oils—	℔ gal.
Black, 29 gravity, 25@30 cold test	.13 @13½
29 gravity, 15 cold test	.13½@14
Summer	.12½@13
Cylinder, light filtered	.20½@21
Dark, filtered	.18 @19
Paraffine, 903-907 sp. gravity	.14½@15
903 sp. gravity	.13½@14
883 sp. gravity	.11 @11½
Red	.13½@14

Miscellaneous—	
Barytes:	
White, Foreign ℔ ton	$18.50@20.50
Amer., floated ℔ ton	17.00@18.00
Off color ℔ ton	12.50@15.00
Chalk, in bulk ℔ ton	3.00@ 3.40
China Clay, Imported ℔ ton	11.50@18.00
Cobalt, Oxide ℔ 100 lb	1.45@ 2.60
Whiting, Commercial ℔ 100 lb	42@52
Gilders ℔ 100 lb	.55@ .60
Ex. Gilders ℔ 100 lb	.60@ .65

Putty, Commercial— ℔ 100 lb	
In bladders	$1.70 @1.80
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine— ℔ gal.	
In Oil bbls	42½@43
In machine bbls	43 @43½

Glue—	℔ lb
Cabinet	.12 @15
Common Bone	.7½@ 9
Extra White	.18 @24
Fish, liquid, 50 gal. bbls., per gal. lon	.60 @1.20
Foot Stock, White	.12 @14
Foot Stock, Brown	.9 @11
German Common Hide	.10 @12
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.10 @12
Medium White	.14 @17

Gum Shellac—	℔ lb
Bleached, Commercial	.22 @23
Bone Dry	.26 @27
Button	.30 @40
Diamond I	@39
Fine, Orange	.30 @35
A. C. Garnet	.23 @24
G. A. L	.20 @21
Kala Button	.15½@16
D. C	@41
Octagon B	.34½@35
T. N	.22 @23
V. S. O	@39

Colors in Oil—	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White and Red, Lead &c.—	℔ lb
Lead, English white, in Oil	.10¼@10¾
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs	7
Dry and in Oil, 25 and 50 lb kegs	7¼
Dry and in Oil, 12½ lb kegs	7½
In Oil, 25 lb tin pails	7½
In Oil, 12½ lb tin pails	8
In Oil, 1, 2, 3 and 5 lb tin cans, ass't	9
Red Lead and Litharge:	
In 100 lb kegs	7
In 25 and 50 lb kegs	7¼
In 12½ lb kegs	7½
In lots of less than 500 lbs, ½¢ ℔ lb advance over above prices of White and Red Lead and Litharge.	
Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry—	℔ lb
American, dry	5¼@ 5⅝
Red Seal (French process)	6⅝@ 7
Green Seal	7¼@ 7½
German Red Seal (French process)	7 @7¼
Green Seal	7¼@ 7⅝
White Seal	8¼@ 9
French, Red Seal	8⅝@ 8⅞
Green Seal	10⅛@10⅝

Dry Colors—	℔ lb
Black, Carbon	.6¼@10
Black Drop, American	.3½@ 8
Black Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, commercial	.4 @ 6
Blue, Celestial	.4 @ 6
Blue, Chinese	.30 @32
Blue, Prussian	.28 @30
Blue, Ultramarine	.3½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3 10@3 25
Green, Chrome, ordinary	.3½@ 5
Green, Chrome, pure	.17 @25
Ocher, American ℔ ton	$8.50@16.00
American Golden	.2¼@ 3¼
French	.1¼@ 2
Foreign Golden	.3 @ 4
Orange Mineral, English	.10 @12
French	.12¾@13
German	.12 @13
American	.9 @10
Red, Indian, English	.4½@ 6
American	.3 @ 3¼
Red, Turkey, English	.4 @10
Red, Tuscan, English	.7 @10
Red, Venetian, Amer. ℔ 100 lb	$0.50@1.25
English ℔ 100 lb	$1.15@1.60
Sienna, Italian, Burnt and Powdered	.3 @ 9
Italian, Raw, Powdered	.3 @ 7
American, Raw	.1½@ 2
American Burnt and Pow'd	.1½@ 2
Talc, French ℔ ton	$18.00@25.00
American ℔ ton	15.00@25.00
Terra Alba, French ℔ 100 lb	.90@ 1.00
English ℔ 100 lb	.80@ 1.00
American ℔ 100 lb, No. 1	.75@ .90
American ℔ 100 lb, No. 2	.60@ .65
Umber, T'key, Bnt. & Pow.	.2½@ 3
Turkey, Raw and Powdered	.2½@ 3
Burnt, American	.1½@ 2
Raw, American	.1½@ 2
Yellow, Chrome, Pure	.12¾@15
Vermilion, American Lead	.7 @25
Quicksilver, bulk	.65 @..
Quicksilver, bags	@65
English, Imported	@70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Columbian and Domestic....33⅓%
North's 10%
Upson's Patent, ₱ gro., $29.90....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent....10%
Ives' Stop Bead Screws and Washers 10%
Taplin's Perfection....10%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti—Rattlers—
Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs ....$2.00@$3.00

Anvils—American—
Eagle Anvils....₱ lb @8 ¢
Hay-Budden, Wrought....9½@9¾ ¢
Trenton ....₱ lb 9¼@9¾ ¢

Imported—
Swedish Solid Steel Paragon, ₱ lb ....10@10½ ¢
Swedish Solid Steel Sisco, Superior, ₱ lb....10@10½ ¢
Peter Wright & Sons, ₱ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½ ¢.

Anvil, Vice and Drill—
Millers Falls Co,, $18.00....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co....10%

Augers and Bits—
Com. Double Spur....75&10@80%
Jennings' Patn., Bright.65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers....70%
Car Bits, 12-in. twist....40&10%
Ford's Auger and Car Bits....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list, 25&7½%
No. 30, R. Jennings' list....50%
Russell Jennings'....25&10&2½%
L'Hommedieu Car Bits....15%
Mayhew's Countersink Bits....45%
Pugh's Black....20%
Pugh's Jennings' Pattern....35%
Snell's Auger Bits....60%
Snell's Bell Hangers' Bits....60%
Snell's Car Bits, 12-in. twist....60%
Snell's King Auger Bits....50%
Swan's ....65&10@70%
Swan's, Jennings' Pattern....50%
Wright's Jennings' Bits....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's Pattern, No. 1, ₱ doz., $26; No. 2, $18....60&10%
Ford's, Clark's Pattern...60&5@60&10%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00....60&10%
Swan's 60%

Gimlet Bits—
	Per gro.
Common Dbl. Cut	*$3.00@3.25*
German Pattern, Nos. 1 to 10,	*$4.75; 11 to 13, $5.75*

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames ....20&10%
Universal 20%

Ship Augers and Bits—
Ship Augers....40&10@—%
Ford's ....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' ....33⅓&7½%
Snell's 48%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled ....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@31¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $1.50@1.00
Handled, Socket.gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality....$4.75@5.00
Second Quality....$4.25@4.50
Double Bit, base weights:
First Quality....$7.00@7.50
Second Quality....$6.50@6.75

Axle Grease—
See *Grease, Axle.*

Axles— *Iron or Steel.*
Concord, Loose Collar...4¼@4½¢
Concord, Solid Collar....4½@5 ¢
No. 1 Common, Loose...3½@4 ¢
No. 1½ Com., New Style..4¼@4¾¢
No. 2 Solid Collar....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12....70%
Nos. 13 to 14....70%
Nos. 15 to 18...70&10@70&10&5%
Nos. 19 to 22...70&10@70&10&5%

Boxes, Axles—
Common and Concord, not turned ....lb., 5@6¢
Common and Concord, turned, lb., 6@7¢
Half Patent....lb., 9½@10¢

Bait— Fishing—
Hendryx:
A Bait....20%
B Bait....25%
Competitor Bait....20&5%

Balances— Sash—
Caldwell new list....50&10%
Pullman ....50&10%

Spring—
Light Spring Balances..60@60&5%
Chatillon's:
Light Spg. Balances....50@50&10%
Straight Balances....40@40&10%
Circular Balances....50&10%
Large Dial....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 2¼@2½¢

Towel—
No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beam, Scale—
Scale Beams....40%
Chattillon's No. 1....30%
Chatillon's No. 2....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned....₱ doz. $1.50

Beaters, Egg—
Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, $1.50; No. 2, Family Size, $7.50; No. 3, Extra Family Size, $24.00; No. 4, Hotel Size, $30.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

Bellows—
Blacksmith, Standard List:
Split Leather....60&10@65%
Grain Leather....50@50&10%

Hand—
Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$5.00*	*5.50*	*6.00*	*6.50*	*7.50*

Molders—
Inch..	*10*	*12*	*14*	*16*
Doz..	*$7.50*	*9.00*	*12.00*	*15.00*

Net Prices.

Bells— Cow—
Wrought Cow Bells....75%
Jersey ....75&10%
Texas Star....50%

Door—
Home, R. & E. Mfg. Co.'s....55&10%

Hand—
Polished, Brass....60@60&10%
White Metal....60@60&10%
Nickel Plated....50&10%
Swiss ....50&10%
Cone's Globe Hand Bells....33⅓@33⅓%

Miscellaneous—
Farm Bells....lb., 2¼@2½¢
Church and School....60@60&10%

Belting— Leather—
First Quality, Ex. Hy., Strictly Short Lap....60&10%
Standard ....70&10@70&10&5%
Light Double....75&10%
Cut Leather Lacing....45@50%
Leather Lacing Sides, per sq. ft.25¢

Rubber—
Competition (Low Grade), 70&10@75%
Standard ....60&10@70%
Best Grades....40@50%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1908 list:
Chain, Parts, Spokes....50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks Tackle—
Common Wooden....75@75&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—
Paper and Wood Lined....55%
Embossed 55%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co....33⅓&10%

Bolts Carriage, Machine, &c.—
Common Carriage (cut thread): ⅜ x 6 and smaller....75&5%
Larger and longer....70&5%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends, with C. & T. Nuts, 70&10%
Machine (Cut Thread): ¾ x 4 and smaller....75&10%
Larger and longer....70&10%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knobs:
Inch ...	*3*	*4*	*5*	*6*	*8*
Per doz..	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:
Inch	*6*	*8*	*10*
Per doz....	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:
Inch	*6*	*8*	*10*
Per doz....	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch	*6*	*8*	*10*
Per doz....	*$0.75*	*.95*	*1.25*

Wrought Barrel Japanned, 80&10@80&10&5%
Barrel Bronzed....60&10%
Spring ....70&10@70&10&10%
Shutter ....50&5@50&10&5%
Square Neck....75&75&10%
Square ....70&10&10@80%
Ives' Mortise....10%
Ives' Wrought Metal....10%

Expansion—
F. H. Evans' Crescent....40@60%
Richards Mfg. Co....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type....40%
Star, Machine, Single Wedge....60%
Star, Machine, Double Wedge....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double....60%
Style No. 1, Single....60%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw....66⅔%

Plow and Stove—
Plow ....65&5@70%
Stove ....85@85&5%

Tire—
Common Iron....80%
Norway Iron....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84. 82½%
Bay State, list Dec. 28, '99....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99....80%
Norway Phila., list Oct. '84....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts....72½%

Borers, Bung—
Borers Bung, Ring, with Handle:
Inch....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.80*	*5.60*	*6.40*	*8.00*
Inch....			*2¼*	*2½*
Per doz....			*$8.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each....25%

Boxes, Mitre—
C. E. Jennings & Co....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme ....15&10%
Perfection 40%
Seavey 45%

Braces—
Comman Ball, American....$1.50
Barber's ....50&10&10@60&10%
Fray's Genuine Spofford's....60%
Fray's No. 61, 166, 256, 614....50%
C. E. Jennings & Co....50&5%
Mayhew's Ratchet....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces....25&10%
P., S. & W. Co., Peck's Pat....60&10%

Brackets—
Wrought Steel....75&10&5@80%
Bradley Metal Clasp...80&10@80&10&5%
Griffin's Pressed Steel....75@75&10%
Griffin's Folding Brackets....70&10%
Taplin Victor Handy Egg Beater Bracket ....₱ doz. $1.50

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co....75&20%
Wire Goods Co....75%

Buckets, Galvanized—
M'fr's list, price per gross.

Quart..	*10*	*12*	*14*
Water, Reg...	*26.85*	*29.50*	*33.50*
Water, Hvy...	*45.35*	*48.00*	*52.00*
Fire, Rd. Btm.	*32.00*	*34.65*	*38.65*
Well	*37.35*	*41.35*	*45.35*

10&7½&5&5%

Bull Rings—See *Rings, Bull.*

Butts— Brass—
Wrought, High List, Oct.'06..65%
Cast Brass, Tiebout's....40&10%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow....40&10@50%
Loose Joint....70&10@75%
Loose Pin....70&10@75%
Mayer's Hinges....70@70&5
Parliament Butts....70@70&5

Wrought Steel—
Bright.
Light Narrow, Light Reversible ....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c....70%
Back Flaps, Table Chest..65%
Japanned.
Light Narrow, Loose Pin, 40&5%
Light Narrow, Ball Tip..60%
Broad ....40&5%
Steeple Tipped....70%
Ball Tipped....70%

Extra, 10

Cages, Bird—
Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze: Series 700, 800.... 30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—
Blunt, 1 prong, per 100 lb., $3.50@$3.85
Sharp, 1 prong, per 100 lb., $4.00@$4.35
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¾¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel..... 4¾¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—
See *Openers, Can.*

Caps, Percussion—
Eley's E. B...... 52@55¢
G. D...... *per M* 34@35¢
F. L...... *per M* 40@42¢
G. E...... *per M.* 48@50¢
Musket ..... *per M* 62@63¢

Primers—
Berdan Primers, $2 per M.. 20&5%
Primer Shells and Bullets.. 15&10%
All other primers per M. $1.52@1.60

Carpet Stretchers—
See *Stretchers, Carpet.*

Cartridges—
Blank Cartridges:
32 C. F., $5.50..... 10&5%
38 C. F., $7.00..... 10&5%
22 cal. Rim, $1.50..... 10&5%
32 cal. Rim, $2.75..... 10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball..... $1.40
Central Fire..... 25%
Target and Sporting Rifle. 15&5%
Primed Shells and Bullets. 15&10%
Rim Fire, Sporting..... 50%
Rim Fire, Military..... 15&5%

Casters—
Bed ..... 65&10@70%
Plate ..... 60@60&5%
Philadelphia ..... 70&10@75%
Acme, Ball Bearing..... 35%
Gem (Roller Bearing)..... 70&10&10&5%
Steel Gem (Roller Bearing)..... 70%
Standard Ball Bearing..... 45%
Yale (Double Wheel) low list... 40&10%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Proof Coil—
American Coil, Straight Link:

3-16	¼	5-16	⅜	½	⅝
$7.70	5.10	4.15	3.50	3.30	3.10

¾-⅞-1 1⅛ to 1¼ inch.
$3.00 3.10
In cask lots, deduct 25¢.
German Coil..... 70%
German Pattern Coil:
6-0 to 1..... 70&10&5%
2 and 3..... 60&10&10@70%
4, 5 and 6..... 50&10@50&10&5%

Halter—
Halter Chains..... 60&5@60&10%
German Pattern Halter Chains, list July 24, '97.... 60&10&5@70%
Covert Mfg. Co.:
Halter ..... 35&5%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—
Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring. $28.00
6½—6-2, Straight, with ring. $29.00
6½—8-2, Straight, with ring. $32.00
6½—10-2, Str'ght, with ring. $37.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c: No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c... 60&10@60&10&5%

Miscellaneous—
Jack Chain, list July 10, '93:
Iron ..... 60&10&5@60&10&10%
Brass 65%
Safety and Plumbers' Chain. 75%
Gal. Pump Chain....lb., 4½@4¾¢
Bridgeport Chain Co.:
Triumph Halter and Coil. 35&2½@40%
Triumph Dog..... 50&10@60%
Brown Halter and Coil.... 45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain..... 70%
Universal Dbl.-Jointed Chain.... 70%

Chain and Ribbon, Sash—
Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered ..... 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft. ..... $2.00@$5.00
Sash Ribbon Attachments, per set..8¢

Chalk—
Carpenters' Blue..... *gro.,* 50¢
Carpenters' Red..... *gro.,* 50¢
Carpenters' White..... *gro.,* 40¢

Checks, Door—
Bardsley's 45%
Pullman, per gro..... $24.00
Russwin 33⅓%

Chests, Tool—
American Tool Chest Co.:
Boys' Chests, with Tools..... 55%
Youths' Chests, with Tools..... 40%
Gentlemen's Chests, with Tools.. 30%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty..... 45%
Tool Cabinets..... 45%
C. E. Jennings & Co.'s Machinists' Tool Chests..... 7½%

Chisels—Socket Framing and Firmer
Standard List..... 80&10@—%
Buck Bros..... 30%
C. E. Jennings & Co.:
Socket Firmer No. 10..... 25&7½%
Socket Framing No. 15..... 25&7½%
Swan's ..... 66⅔@70%
L. & I. J. White & Co..... 30@30&5%

Tanged—
Tanged Firmers..... 30&5@35%
Buck Bros..... 30%
C. E. Jennings & Co. Nos. 191, 181.. 25%
L. & I. J. White Co..... 25&5%

Cold—
lb.
Cold Chisels, good quality. 13@15¢
Cold Chisels, fair quality. 11@12¢
Cold Chisels, ordinary.... 9@10¢

Chucks—
Almond Drill Chucks..... 35%
Almond Turret Six-Tool Chuck..... 40%
Beach Pat, each $8.00..... 35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks..... 35%
Pratt's Positive Drive..... 25%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws..... 35%
Universal, Com. Style Jaws..... 40%
Combination, Reversible Jaws.... 35%
Combination, Com. Style Jaws... 40%
Round Body or Box Body, 2 Chuck Jaws 25%
Geared Scroll Chucks..... 25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ... 25%
Positive Drive..... 40%
Planer Chucks..... 20%
Standard 45%
Drill Press Vises..... 30%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21..... 35%
Scroll Combinations, Nos. 33 and 34 ..... 30%
Geared Scroll, Nos. 33, 34 and 35.. 25%
Independent Iron, Nos. 18 and 318. 35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104..... 35%
Union Czar Drill..... 25%
Universal, 11, 12, 16, 17, 13, 14, 15.. 40%
Universal No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill..... 50%
Little Giant Double Grip Drill... 50%
Little Giant Drill, Improved..... 50%
Oneida Drill..... 50%
Scroll Combination Lathe..... 50%
Whitaker Mfg. Co.:
National Drill..... 25%

Clamps—
Carriage Makers' Star, P., S. & W. Co. 50%
Besly, Parallel..... 33⅓&10%
Hammer & Co.:
Adjustable ..... 20&5%
Carriage Makers' H. P. Screw. 40&5%
Myers' Hay Rack..... 50%
Lineman's Swedish Neverturn..... 65%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain,
Iwan's Champion, Adjustable..... 50%
Iwan's Champion, Stationary..... 40%

Sidewalk—
American Fork & Hoe Co.:
Star, ℔ doz., Socket, $4.00; Shank $3.50
Shank, ℔ doz., X 7½, $3.50; Shank, X 8..... $3.75

Cleavers, Butchers'—
Foster Bros..... 30%
Fayette R. Plumb..... 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—
Chicago Flexible Shaft Co.:
1902 Chicago Horse, each..$10.75
20th Century Horse, each.. $5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Roll Bearing Horse, each.....$6.75
Stewart's New Model Sheep Shearing Machine, each.$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 20%

Clips, Axle—
Regular Styles, list July 1, '05, 80&80&10%

Cloth and Netting, wire—See *Wire, &c.*

Cocks, Brass—
Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs..... 70%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—
Nickel Chain, Walter B. Stevens & Son's list..... 40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.
Ordinary Goods..... 70&10@75%

Conductor Pipe,—
L. C. L. to Dealers:

	Gal. Steel.	*Charcoal. Copper.*
Northeastern:		
70&10%	50&10&7½%	50&10%
Eastern:		
70&10&5%	50&10&7½%	50&10%
Central:		
75&5%	60%	50&10%
Northwestern:		
75&2½%	60%	50&10%
Western:		
70&7½%	50&12½%	50&5%
Tennessee:		
70&10%	50&12½%	50&10%
Southern:		
70%	50&12½%	50&5%
Southwestern:		
70%	50&5%	50&5%

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—
L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled..... 10%
Agate Lined..... 10%

Coppers' Tools—
See *Tools, Coopers'.*

Coppers, Soldering—
Soldering Coppers, 3 lb. to pair and heavier, 21½¢; lighter than 3 lb. to pair..... 23½¢

Cord—Sash—
Braided, Drab..... *lb.* 35¢
Braided, White, Com., Nos. 8 to 12, 21¢; No. 7, 21½¢; No. 6, 22½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18. 37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India..... *lb., 11@11½¢*
Cotton Sash Cord, Tw'ted. 18@20¢
Patent Russia..... *lb*..... 20¢
Cable Laid Russia..... *lb*.. 21¢
India Hemp, Br'd'd..... *lb*.. 21¢
India Hemp, Twisted.. *lb.* 13@14¢
Patent India, Twisted. lb... 17¢
Pearl Braided, cotton, No. 6, ℔ lb, 20½¢; No. 7, 19½¢; Nos. 8 to 12, 19½¢, in 12 doz., to 100 doz. lots.
Eddystone, Braided, Nos. 5 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10..... ℔ lb 23¢
Pullman:
Wire Sash Cord..... 10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@ 50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord..... 50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab...℔ lb 45¢
Phoenix, White, Nos 8 to 12.... 27¢
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—
Full Length..... 90@—%
Short Length..... 90&20@—%
Hendryx Standard Wire Picture Cord, old list. 85&10%
Turner & Stanton Co. Wire Picture Cord 90%

Cradles—
Grain 50%

Crayons—
White Round Crayons, Cases. 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16..... $3.00
Suremark, Black, $2.25; Blue, Red and Yellow..... $2.50

Crooks, Shepperds'—
American Fork & Hoe Co.:
Montana ..... ℔ doz. $4.50

Crow Bars—See *Bars, Crow.*

Cultivators—
American Fork & Hoe Co.:
Victor Garden..... 50&10%

Cutlery, Table—
International Silver Company:
No. 12 M'd'm Knives, 1847 ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor..... ℔ doz. $3.00
Wm. Rogers & Son..... ℔ doz. $2.50

Cutters—Glass—
H. H. Mayhew Co..... 40%
Red Devil..... 60%
B. Mfg. Co..... 40%
Woodward 50%

Meat and Food—
American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32	
Each	$2	$3	$2.75	$4.50	$6	25@25&7½%

No. 202, $1.50..... 40&7½%
P., S. & W. Co.:
Ideal ..... 40@40&5%
Hales ..... 60&5%
Little Giant..... ℔ doz. 40@40&5%

Nos..	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$60.00

New Triumph No. 605, ℔ doz. $24.00, 40%
Russwin Food, No. 1, $24.00; No. 2, $27.00; 3, $12.00..... 45&10&10%
$15.00 $18.00
Enterprise Beef Shavers..... 25@30%

Slaw and Kraut—
Henry Disston & Sons:
Slaw and Kraut Cutters..... 35%
Corn Graters..... 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ℔ doz. $4.00

Tobacco—
All Iron, Cheap...doz, $4.25@4.50
Enterprise ..... 25@30%
National, ℔ doz., No. 1, $21; No. 2, $18 ..... 40%

Diggers, Post Hole, &c—
Disston's:
Rapid, ℔ doz., $24.00..... 25%
Samson, ℔ doz., $34.80..... 25%
Iwan's Pat. Post Hole and Well Auger 40%
Vaughan Pattern Post Hole Augers, ℔ doz., $7.00
Perfection Post Hole Diggers, ℔ doz. $8.50
Split Handle Post Hole Diggers, ℔ doz., $7.50
Hercules Pattern, ℔ doz..... $9.50
Kohler's, ℔ doz., Universal $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer..... $7.50
Never-Break Crucible Steel Post Hole Diggers 60%

Dividers—See *Compasses.*

Drawing Knives—
See *Knives, Drawing.*

Dressers Emery Wheel—
Sterling Emery Wheel Dressers..... 35%
Sterling Wheel Dresser Cutters..... 35%

Drills and Drill Stocks—
Blacksmith's Common Drilling Machines ..... $1.50@1.75
Breast, Millers Falls..... 15&10%
Breast, P., S. & W..... 33½%
C. & C. Ratchet..... 25%
Reversible Ratchet Die Stocks.... 25%
Goodell Automatic Drills. 50&10@60&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills, 33⅓&10%
Ratchet, Curtis & Curtis..... 25%
Ratchet, Parker's..... 40%
Ratchet, Weston's..... 40%
Ratchet, Weston's, Style H Improved ..... 40@40&5%
Ratchet, No. 012..... 40@40&5%
Ratchet, Celebrated..... 40@40&5%
Ratchet, Whitney's, P., S. & W.. 40&10@50%
Whitney's Adjustable, No. 10, $12.00, 33⅓%

Twist Drills—
Bit Stock..... 70@70&5%
Taper and Straight Shank, 60&10@70%

Drivers, Screw—
Screw D'ver Bits, per doz.. 45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2½-in., $5; 4-in., $7.50; 6-in., $9 ..... 50%
Buck Bros.' Screw Driver Bits..... 30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet..... 35%
Goodell's Auto..... 65@65&10%
Mayhew's Black Handle..... 40%
Mayhew's Monarch..... 40%
Millers Falls, ℔ doz., Nos. 11, $9.95; 12, $13.73; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 60%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*Gal. Steel.*	*Copper.*
Northeastern..	75&10&5%	50&10%
Eastern.....	80%	50&10%
Central.....	80&10&5%	50&10%
Northwestern..	80&10&5%	50&10%
Western	80&5%	50&5%
Tennessee.....	80&5%	50&10%
Southern.....	75&10%	50&5%
Southwestern..	75&10&2½%	50&5%

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are made in some sections.
See also Conductor Pipe and Elbows.

Elbows and Shoes—
Factory shipments, all territories: Galv. Steel, Galv. C. I. and Copper.
Sizes 2, 3, 4..... 80%
Sizes 7½, 2½, 3½, 5, 6... 60&10%
No. 26..... 50%
No. 24..... 25%
Copper Elbows..... 50%

Elbows, Stove Pipe—
Edwards, Standard Blue....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, Flat Crimp..40&10&5%

Emery, Turkish—

	¼ to 46:	*5½ to 220:*	*Flour.*
Kegs .....*lb.*	5¢	5½¢	3½¢
½ Kegs.....*lb.*	5½¢	5¾¢	3¾¢
¼ Kegs.....*lb.*	5½¢	6¢	4¢

10-lb. cans, 10 in case....6½¢ 7 ¢ 6 ¢
10-lb. cans, less than 10.....10 ¢ 10 ¢ 8 ¢
Less quantity..10 ¢ 10 ¢ 8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—
Ford's Auger Bit Extensions....40&5%

Extractors, Lemon Juice—
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's Jap'd and Galv., 50 & 5%; Bronze and Plated.....50%
Walling's 50%
Upson's Patent.....40%

Cord and Weight—
Ives, ₱ gro., $1.08.....10%
Titan, ₱ gro., $0.66.....10%

Corrugated—
Acme Corrugated Fasteners.....70%

Faucets—
Cork Lined.....50&10@60%
Metallic Key, Leather Lined, ..60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined..50%
John Sommer's Reliable Cork Lined..50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined..50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, Self Measuring and Pump, ₱ doz., $36.00.....40&10%
Lane's, ₱ doz., $36.00.....40&10%
National Measuring, ₱ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade....75&10&10@80&10%
Gold Medal.....70%
McCaffrey's American Standard, 60&10&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33⅓@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

Peck, Stow & Wilcox Co.:

In.	15	17	19	21	24
	$4.00	4.40	4.75	5.50	6.50....30%

Reading Hardware Co.....60%

Fodder Squeezers—
See *Compressors.*

Forks—
American Fork & Hoe Co.:
Iowa Dig-Ezy Potato.....70&5%
Hay, Regular, 3-tine.....45&20&12½%
Hay, Regular, 4-tine.....60&7½&5%
Champion, Hay.....60&12½%
Acme, Hay.....60&20%
Manure, Regular, 4-tine.....65&5%
Manure, Regular, 5 and 6 tine...70%
Champion, Manure.....65&5%
Columbia, Manure.....70%
Acme, 4-tine.....60&10&5%
Round Shoulder Header, 4-tine..65%
Champion, ₀Header.....65%
Dakota, Header.....65%
Kansas Header.....65%
Wood, Barley.....35&5%
Steel, Barley.....66⅔%
Columbia, Spading.....70&7½&5%

Frames— Wood Saw—
White, S'g't Bar, per doz. 75@80¢
Red, S'g't Bar, per doz. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—
See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp.....$2.75
Cotton.....3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
} 2½&10%

Gates, Molasses and Oil—
Stebbins' Pattern.....80@80&5%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..67½%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P. S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush, 25&10@50%
Elwell's 40%

Grease, Axle—
Common Grade...gro. $6.00@$6.50
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—
Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50.....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....65@65&10%
Bridgeport Chain Co.:
Triumph Coil and Halters.35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50&5@50&10&5%
Brown Tie Outs.....70&10@75&5%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'....55&10@55&10&5%
Heller's Farriers.....40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel.....40&10@50%
Farriers' .....40&10@50%
Riveting .....40&10@50%
Machinists' .....66⅔@5%
Blacksmiths' 50%
Fayette R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand.50&10&5@60&5%
Machinists' Hammers.....60&10&5%
Rivet and Tinners'.40&7½@40&12½&5%
Victor Magnetic Tack, ₱ gro....$7.75

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢...80&10&10%
Over 5 lb., per lb., 30¢.....
Over 5 lb., per lb., 30¢.80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $3.00@$3.50
Brad Awl.....gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c., 60&10@60&10&5%
Hand Saw, Varnished, doz., 80¢ 85¢; Not Varnished.....65@75¢
Plane Handles:
Jack, doz., 30¢; Fore, doz...45¢
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $3.00; No. 2, $2.50: No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 12., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
} 50%

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00: Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track....50%
Lawrence Bros.:
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
Trolley, No. 30, ₱ pair.....$1.25
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2..70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B, D, No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B, D, No. 20.....50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing, ₱ doz., 4 in., $12.00; 5 in., $14.00..40&10%
Myers' Stayon Hangers.....60%
Extra 50&10% often given.

Hangers— Garment—
Pullman Trouser, ₱ gro., No. 1 $9.00; No. 4, $24.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.00
Victor Folding.....₱ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₱ doz., net 50%

Joist and Timber—
Lane Bros. Co.....35%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

Hatchets—
Regular list, first qual.40&12½%—
Second quality.....50&10&5%—

Heaters, Carriage—
Clark, No. 5, $1.25; No. 5B, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 7D, $2.25; No. 3E, $2.50; No. 1, $3.00.....25%
Clark Coal, ₱ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind:
Doz. Sets with Fastenings, No. 1, $0.70; No. 3, $1.25; No. 5, $2.65.
Mortise Shutter.....80%
Mortise Reversible Shutter..80%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70&75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O. P., No. 1.....75&10%
Clark's O. P., Nos. 3 and 5....75&5%
Tip Pat'n, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.25*	*1.90*	*3.50*
Latches only	*.70*	*.75*	*.35*

New England:
With Latch.....doz..@$2.00
Without Latch.....doz..@$1.60
Reversible Self-Closing:
With Latch.....doz..@$1.75
Without Latch...doz.....@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz..$1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Miscellaneous—
Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₱ doz. prs.....$1.00

Pivot Hinges—
Bommer Bros. Pivot, Ball Bearing 40%
Lawson Mfg. Co, Matchless.....30%

Spring Hinges—
Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, C'st Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing 40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 999.....₱ gro, $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor.50%
Garden City Engine House...25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ₱ gr., No. 14, $9.00; No. 18.....$25.00
Columbia, Adj., No. 7, ₱ gr.$12.00
Gem, new list.....30%
Clover Leaf and Acorn, per gro. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Columbian Steel.....65&10%
Lawson Mfg. Co.:
Matchless Spring Hinges.....30%
Matchless Jamb Hinges.....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
Chief Ball Bearings Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ₱ gr. pr.....$9.00
Standard Mfg. Co.:
Champion Double Acting Door Hinge .....25&10&10%
Standard Double Acting Floor Hinge .....25&10&10%
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
Spring Hinges.....33⅓%
Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list February 10, 1908:
Light Strap Hinges..50&10%
Heavy Strap Hinges..60&5%
Light T Hinges.....50%
Heavy T Hinges.....40%
Extra Hvy. T Hinges.50&10%
Hinge Hasps.....33⅓%
Cor. Heavy Strap....60&5%
Cor. Ex. Heavy T....50&10%
Extra 10&7½%.

Screw Hook and Strap.
6 to 12 in..lb. 3½¢
1½ to 20 in..lb. 3½¢
22 to 36 in..lb. 3 ¢

Screw Hook and Eye:
½ to 1 inch.....lb. 6½¢
⅝-inch .....lb. 7½¢
½-inch .....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross:

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*33*
Galv. Funnel	*43*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

10&7½&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—

Scovil and Oval Pattern, 60&10@60&10&10%
Grub, list Feb. 23, 1899, 70&10@70&10&10%
D. & H. Scovil 7½%
Am. Fork & Hoe Co. (Scovil Pattern) ..... 60&5%

Handled—

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit $2.50
American Fork & Hoe Co.:
Regular, Cotton ..... 75&10&5&2½%
Crescent, Cultivator ..... 75&2½%
Mattock, Senior 70%
Mattock, Junior 70%
Sprouting 50%
Tobacco, Harper's ..... 66⅔&15&10%
Warren ..... 55&10&10&5%
Ivanhoe ..... 65&15&10%
Cultivator, B B 6 ..... 70&10&10&5%
Cultivator, B B 6½ ..... 70&10&10&5%
Weeding, Acme ..... 72½&10&2½%
Scuffle, Lightning ..... 60&5%

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ℔ doz. $24.00 ..... 45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze 25%
Empire 50%
Pullman 25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip 50%
Superior 33⅓%

File and Tool—

Nicholson File Holders and File Handles ..... 33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ℔ gross, $18.00; ℔ doz. $2.00

Trace and Rein—

Fernald Double Trace Holder, ℔ doz. pairs $1.25
Dash Rein Holder, ℔ doz. $1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German 33⅓%

Hooks—Cast Iron—

Bird Cage, Reading 40%
Clothes Line, Reading List 40%
Coat and Hat, Reading ..... 45&20%
Coat and Hat, Wrightsville ..... 60&5%
Harness, Reading List 40%

Wire—

Belt, Nos. 1 to 15 ... 75&10@80%
Wire C. & H. Hooks .. 80@80&10%
Bradley Metal Clasp Wire, Coat and Hat, 75&10@80%; Ceiling .. 75&10@80%
Columbian Hdw. Co., Gem ..... 75&10%
Parker Wire Goods Co., King .. 75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70&10%; Crown, 75%; Czar, 65&10%; V Brace, 75%; Czar Harness, 50%; Ceiling, 75%.

Wrought Iron—

Box, 6 in., per doz., $0.90; 8 in., $1.15.
Cotton ..... doz. $1.25@$1.50
Wrought Staples, Hooks, &c.— See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz., $2.75@$3.00
Grass, common grades, all sizes, per doz ..... $1.25@$1.50
Whiffletree ..... lb. 5¾@6¢
Hooks and Eyes:
Brass ..... 60@60&10%
Malleable Iron ..... 70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks 40%
Turner & Stanton Co. Cup and Shoulder ..... 85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition ..... ft. 6@6½¢
3-ply Guaranteed ..... ft. 8½@9¢
4-ply Guaranteed .... ft. 9½@12¢
Cotton Garden, ¾-in., coupled:
Low Grade ..... ft. 8@ 9¢
Fair Quality ..... ft. 10@11¢

Irons— Sad—

From 4 to 10 ..... lb. 2½@2¾¢
B. B. Sad Irons ..... lb. 3¼@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Caps	86	93	96	93
Tin'd Caps	91	88	1.01	98

New England Pressing .. lb. 3¾@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner 60%

Pinking—

Pinking Irons ..... doz. 60@65¢

Irons, Soldering

See *Coppers.*

Jacks, Wagons—

Covert Mfg. Co.:
Auto Screw ..... 30&2%; Steel, 45%
Lockport 50%
Lane's Steel ..... 30&5%
Richards' Tiger Steel, No. 130 ... 50&10%
Smith & Hemenway Co.'s 25%

Ladder—

Richards Mfg. Co., Ladder Jacks .. 50%

Jointers—

Pike Mfg. Co., Saw Jointers, $7.00 .. 40%

Kettles—

Brass, Spun, Plain ..... 20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c. 30%
Wilkinson Shear & Cutlery Co. ... 60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks 60%
American Fork & Hoe Co.:
Easy Cut, ℔ doz., No. 10 C H ... $2.10
Easy Cut, ℔ doz., No. 10 B C H . $2.20
Acme, ℔ doz. $2.35
Dent, ℔ doz. $2.35
Adjustable, Serrated, ℔ doz. $1.90
Serrated, ℔ doz. $1.85
Yankee, No. 1 C H $1.35
Yankee, No. 2 C H $1.15

Drawing—

Standard List ..... 80&10@—%
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's ..... 66⅔&10%
Watrous 16⅔%
L. & I. J. White ..... 20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.00@5.50
Iwan's Sickle Edge ..... ℔ doz. $9.50
Iwan's Serrated ..... ℔ doz. $10.00

Miscellaneous—

Farriers' ..... doz. $2.60@3.55
Wostenholm's ..... ℔ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch or Maple, Rubber Tip ..... gro. $1.25@1.40
Carriage, Jap., Drive, all sizes, gro. 35@40¢
Door, Mineral ..... doz. 65@70¢
Door, Por. Jap'd ..... doz. 70@75¢
Door, Por. Nickel .. doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See *Belting, Leather*

Ladders, Store, &c.—

Lane's Store 25%
Myers' Noiseless Store Ladders 50%
Richards Mfg. Co.:
Improved Noiseless, No. 112 ..... 50%
Climax Shelf, No. 113 ..... 50%
Trolley, No. 109 ..... 50%

Ladles, Melting—

L. & G. Mfg. Co., Melting and Plumbers' 25%
P., S. & W. ..... 40&10%
Reading 60%

Lamps,—

Hammer's M. I. Hand 45%

Lanterns—Tubular—

Regular, No. 0 ..... doz. $4.35@4.50
Side Lift, No. 0 ..... doz. $4.60@4.75
Hinge Globe, No. 0. doz. $4.60@4.75
Other Styles ..... 40@40&10%

Bull's Eye Police—

3-inch ..... $3.75@4.00

Latches— Thumb—

Roggin's Latches, Jap'd, with Screws ..... doz. 35@40¢

Door—

Cronk & Carrier Mfg. Co., No. 101, ℔ doz. $2.00
Richards' Bull Dog, Heavy, No. 125 ..... 50&5%
Richards' Trump, No. 127 ..... $1.50

Leaders, Cattle—

Small ..... doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps—*

Lifters, Transom—

R. & E. 10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.30*	*1.95*	*1.75*
75 feet	*$1.95*	*1.65*	*1.50*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3 .. 40%
Solid Braided Masons' 30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ..... ℔ gr. 20%
Masons' Lines, Shade Cord, &c.; White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50 ..... 20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 ..... 20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25 ..... 20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines 40%
Clothes Lines, White Cotton 20%
Shade Cord, Cotton or Linen 20%

Locks— Cabinet—

Cabinet Locks .... 33⅓@33⅓@5%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co. 40%
R. & E. Mfg. Co. 10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass ..... 75&10%

Sash, &c.—

Ives' Patent:
Crescent 10%
Automatic Gravity Metal Sash, ℔ gro., $149.58 ..... 10%
Window Ventilating 10%
Pullman Patent Ventilating Lock .. 25%
Reading Sash Locks 40%
Taylor Mfg. Co., Perfect Ventilating, ℔ doz. ..... $0.75@$1.00

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Ford Auger Bit Co. $22.00
Jennings', Nos. 1 and 4 ..... 25&7½%
Millers' Falls 5.75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved ..... 40&10%

Corking—

Reisinger Invincible Hand Power ... ℔ doz. $48.00

Fence—

Williams' Fence Machines .... each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist, 30%
Moore's Hand Hoist, with Lock Brake 20%
Moore's Cyclone High Speed Chain Hoist 25%

Ice Cutting—

Chandler's 12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory ..... 45&5@50%
Lignumvitæ ..... 45&5@50%
Tinners' Hickory and Apple-wood ..... doz. 45&5@50%

Mangers, Stable—

Swett Iron Works 50%

Mats, Door—

Acme Flexible Steel 50%
Elastic Steel (W. G. Co.), new list, 50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.:
Coffee ..... 20@25%
Shell and Corn ..... 25&10%
National list Jan. 1, 1902 ..... 30%
Parker's Columbia and Victoria .. 33⅓%
Parker's Box and Side ..... 50&10%
Swift, Lane Bros. Co. 30%

Motors, Water—

Divine's Red Devil 30%

$2.50	3.50	10.00	15.00	..... 33⅓%
No. 1	2	3	4	
Lippincott's:				
No.	1	2	3	4
	$2.50	3.50	10.00	15.00 .. 33⅓%

Pike Mfg. Co., Tool and Knife Grinding 33⅓%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest, 10-in., $2.00; advance 10¢ for each size.
Cheap, 10-in., $2.25; advance 15@20¢ for each size.
Better Grade, 10-in., $3.00; advance 25¢ for each size.

	12	14	16	18-in.
High Grade ... $4.50	*4.75*	*5.00*	*5.25*	
Continental 60%				
Great American 70%				
Great American Ball B'r'g, new list. 70%				
Quaker City 70%				
Pennsylvania 60%				
Pennsylvania, Jr., Ball Bearing. 50&10&5%				
Pennsylvania Golf 50%				
Pennsylvania Horse ..... 33⅓&5%				
Pennsylvania Pony ..... 40&5%				

Nails—

Wire Nails and Brads, Miscellaneous ..... 85&5@85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	.. ℔ lb. net, 12¢
Coleman	13	12	12	11	11	net ℔ lb
New Haven..	23	21	20	19	18	.. ℔ lb. net, 12¢
Livingston ..	19	18	17	16	16	..... 10%
Western						℔ lb 8½¢

Jobbers' Special Brands, per lb. 9¢

Picture—

	1½	2	2½	3 in.
Brass Hd. gro.	*.45*	*.55*	*.60*	*.70*
Por. Head, gro.	*1.10*	*1.10*	*1.10*	

Upholsters—

Brass 30%
Plated ..... 30&10%

Nippers—

See *Pliers and Nippers.*

Nipples—

Standard Nipple Co.:
Wrought Pipe Nipples 80%

Nuts— *Blank or Tapped.*

Cold Punched:	*Off list.*
Square	*5.30¢*
Hexagon	*5.90¢*
Square, C., T. & R.	*5.70¢*
Hexagon, C., T. & R.	*6.50¢*
Hot Pressed:	Off list.
Square	*5.80¢*
Hexagon	*6.30¢*

Oakum—

Best ..... lb. 6½¢
U. S. Navy ..... lb. 6 ¢
Navy ..... lb. 5 ¢
Plumbers' Spun Oakum .. 2¾@3 ¢

Oil—

Pike Mfg. Co., Stonoil 40%

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated 75%
Chase or Paragon:
Brass and Copper ..... 50&10%
Zinc ..... 65&10@70%
Railroad ..... 60&10&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers, &c. ..... 60@60&10%
Maple City Mfg. Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers, &c. ..... 60@60&10%

Openers—Packing Box—

Herculever, ℔ doz., $24 ..... 30%

Can Openers—

	Per doz.
Sprague, Iron Handle .... 30@35¢	
Sprague, Wood Handle ..... 40¢	
Sardine Scissors ..... $1.75@3.00	

Can and Bottle Openers, ℔ doz., net: Yankee, $0.75@$0.85; Little Gem, $0.50@$0.65; Nifty $0.75

Egg—

Hartigan Nickel Plate, ℔ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope, any quantity ..... 18@20¢

Rubber—

(Fair quality goods.)
Sheet, C. I ..... 11@12¢
Sheet, C. O. S ..... 11@12¢
Sheet, C. B. S ..... 12@13¢
Sheet, Pure Gum ..... 40@45¢
Sheet, Red ..... 40@50¢
Jenkins' '96, ℔ lb, 80¢ 25%

Miscellaneous—

American Packing .... lb. 7@10 ¢
Cotton Packing ..... lb. 16@25 ¢
Italian Packing ..... lb. 9@10¢
Jute ..... lb. 4@4¼¢
Russia Packing ..... lb. 9@10¢

Pails, Water, Well, &c.—

See *Buckets.*

Paint—

Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size 20%

Pans— Dripping—

Standard List ..... 75&10@80%
Edwards, Royal Blue 75%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.85*	*0.95*	*1.15*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft .. 2½¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft ..... 3½¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in ..... 3¢
Per roll.
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll, $8@$8
Medium weight, 30 lbs. to roll, $6@$7
Heavy weight, 40 lbs. to roll. 75@78¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 p'y, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton $54.50
Red Rope Roofing, 250 sq. ft. per roll $1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton, $34.00@$38.00
2 ply, roll 108 sq. ft ..... 65¢
3 ply, roll 108 sq. ft ..... 88¢
Slater's Felt (roll 500 sq. ft.) .80¢

Sand Paper and Cloth—

Flint and Emery ..... 50&10%
Garnet Paper and Cloth 25%

Parers—Apple—

Goodell Co.:

Family Bay State	℔ doz, $15.00
Improved Bay State	℔ doz. $36.00
New Lightning	℔ doz. $7.00
Turn Table '98	℔ doz. $6.00
White Mountain	℔ doz. $5.00
Bonanza Improved	each $7.50
Dandy	each $10.00
Eureka Improved	each $20.00
New Century	each $20.00
Ranger	each $30.00

Livingston Nail Co.:
Daisy ..... ℔ doz. $4.00
Little Star ..... ℔ doz. $5.00
Rocking Table ..... ℔ doz. $6.20
Reading Hardware Co.:
Advance ..... ℔ doz. $4.00
Baldwin ..... ℔ doz. $4.00
Reading 72 ..... ℔ doz. $3.25
Reading 78 ..... ℔ doz. $6.25

Orange—
Goodell Co., Success ..... each $20.00

Potato—
Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—
(List Jan., 1908.)
List ..... 75&10%
Cronk's Handled Garden Mattock, ℔ doz., $3.00 ..... 33⅓%

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass ..... 50@50&10%
Iron, list Nov. 11, '85 .. 60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in. ..... 70&10%
Extra Heavy, 2-6 in. .. 75&10@80%
Fittings, Standard and Heavy, 80&10@85%

Pipe, Merchant—

	Consumers, Steel. Blk.	Galv.	*Carloads, Iron.* Blk.	Galv.
	%	%	%	%
⅛ and ¼ in.	66	50	64	..
⅜ in.	68	54	66	52
½ in.	70	58	68	56
¾ to 6 in.	71	64	72	62
7 to 12 in.	71	56	69	54

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 87%
Second-class 90%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	$5.90	$6.90
6 in., Uniform Color	6.40	7.40
7 in., Uniform Color	7.40	8.40

Planes and Plane Irons—
Wood Planes—
Bench, first qual. ..... 30@30&10%
Bench, second qual. ... 40@40&10%
Molding ..... 25@25&10%
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes -
Chaplin's Iron Planes 60%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06 ..... 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Union 50%
L. & I. J. White ..... 20&2@25%

Planters, Corn, Hand—
Kohler's Eclipse ..... ℔ doz. $7.50

Plates—
Felloe ..... lb. 3¾@4¢
Avery Stamping Co.:
Standard Wrot, Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Steel Pipe Hook—
Never-Break ..... 75&10%

Pliers and Nippers -
Button Pliers. ... 75&5@75&10&5%
Gas Burners, per doz., 5 in., $1.25 @$1.30; 6 in., $1.45, $1.50.

Gas pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button ..... 75&10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10%
Chapin's Imp. Brass Cor. .40@40&10%
Pocket Levels ..... 30@30&10%
Extension Sights ..... 30@30&10%
Machinists' Levels ..... 40@40&10%
Disston's Plumbs and Levels .... 60&10%
Disston's Pocket Levels ..... 60&10%
Stanley's Dulex 35%
Woods' Extension 33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers .... lb. 9 ¢
½-lb. papers ..... lb. 9½¢
¼-lb. papers ..... lb. 10 ¢

Police Goods—
Manufacturers' Lists .. 25@25&5%
Tower's 25%

Polish—Metal, Etc—
Ladd Co.:
Putzade Liquid, ℔ gro., ⅛ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ℔ doz., ⅛ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (⅛ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.00 .. 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ⅛ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can ... each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $1.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50

Window Polish—
Benj. P. Forbes:
Glasbright, No. 2, gal pails, ℔ doz., $24.00; each, $2.50; 1 lb cans, each ..... 75¢
Glasbright Powder, bbls., ℔ lb..20¢

Poppers, Corn—
1 qt. Square..doz.$0.80; gro.$8.75
1 qt. Round..doz.$0.90; gro.$10.00
1½ qt. Square.doz.$1.20; gro.$12.00
2 qt. Square..doz.$1.50; gro.$15.00

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 6 ft., 46¢; 6½ ft., 48¢; 7 ft., 50¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled 40%
Tinned ..... 30&10%

Powder—
In Canisters:
Duck, 1 lb ..... *each 45¢*
Fine Sporting, 1 lb. .... *each 75¢*
Rifle, ½ lb. ..... *each 15¢*
Rifle, 1 lb. ..... *each 25¢*
In Kegs:
12½-lb. kegs *$3.50*
25-lb. kegs *$4.50*
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.90
Case 24 (1 lb cans bulk) $8.50
Half case (1 lb cans bulk) $4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Presses—
Fruit, Wine and Jelly—
Enterprise Mfg. Co. ..... 20@25%

Seal Presses—
Morrill's No. 1, ℔ doz., $20.00 ..... 50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail, Etc.—
Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
The Scranton Co. Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B 70%
Giant 50%
Staple Pullers, Utica and Davison 60%
Taylor Mfg. Co., Sampson Tack, ℔ doz. $0.40

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05

Hay Fork, Swivel or Solid Eye, doz., 4 in., $1.25; 5 in., $1.55

Inch	2	2¼	2½
Hot House, doz.	$0.65	.85	1.20
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz., 1¾ and 2 in. ..... *17@20¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in. .... *20@21¢*
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle ..... 50&10%
Wrought Steel, Eagle ..... 17@20¢
Top Notch, Electrically Welded, Nos. 3 and 4 ..... 13¢
Common Sense ..... ℔ doz. 20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in. ..... 20½¢
No. 26 Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout ..... 75&5@75&10%
Wood Pumps, Tubing, &c. 50%
Barnes Dbl. Acting (low list) 50%
Barnes Pitcher Spout 80%
Contractors' Rubber Diaphragm, No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $6.50
Flint & Walling's Fast Mail Hand (low list) ..... 50&5%
Flint & Walling's Fast Mail (low list) ..... 50&5%
Flint & Walling's Tight Top Pitcher 80%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50 ..... 30%
Myers' Pumps (low list) } 50%
Myers' Power Pumps } 50%
Myers' Spray Pumps } 50%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.	*1*	*2*	*3*	*4*	50@30&10%
	$5.00	6.00	7.00	8.00	

Cup Leathers—Per 100:

Inch.	2½	3	3½	4	50@30&10%
	$5.00	7.00	9.00	12.00	

Punches—
Saddlers' or Drive, good, doz. 50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes) .... *doz. $3.50*
Bemis & Call Co.'s Cast St'l Drive. 50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Tinners' Hollow, P., S. & W. Co.. 40%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 40&10%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron, 2½@2¾¢
Sliding Door, Wrought Brass, 1¼ in., lb., 36¢ 30%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail ..... 2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ℔ 100 ft. $3.45
O. N. T., ℔ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ℔ 100 ft., $7.50; 1¼ x 3-16 in., $8.75 ..... 55&7½%
Trolley, No. 301, ℔ ft. ..... 9¢
McKinney's:
Hinged Hanger Track, ℔ ft., 11¢ ..... 60&5%
1 x 3-16 Track ..... 55&7½%
Myers' Stayon Track ..... 60&5%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50 ..... 60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
American Fork & Hoe Co.:
Lawn, ℔ doz., No. 24, $2.50; No. 20 ..... $2.25
Cronk's:
Steel Garden: Champion, ℔ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal, ℔ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-tooth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00 ..... net
Anticlog Lawn, ℔ doz. $4.00
Malleable Garden ..... 70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00 ..... 80%
Kohler's:
Jumbo Lawn, 36-tooth ... ℔ doz. $5.00
Lawn Queen, 20-tooth ... ℔ doz. $2.85
Lawn Queen, 24-tooth ... ℔ doz. $3.00
Paragon, 20-tooth ..... ℔ doz. $2.65
Paragon, 24-tooth ..... ℔ doz. $2.75
Steel Garden, 14-tooth ... ℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—
Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
Liveright Bros.' Gold Medal. 70&10@75%
McCaffrey's American Standard ..... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—
John Engstrom Swedish 65%
Sharp Shaver 60%
Fox Razors, ℔ doz., No. 42, $24.00; No. 44, $20.00; No. 82, Platina, $36.00. } 10&5%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1210 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P, 33⅓%; 2904 PN., 33⅓%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%; 986 PN, 2904 N, 974 PN 25%
5009 PN 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
NN P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 70%
White Porcelain Enamel .. 50&10%
Solid Brass or Bronze Metal. 40%

Revolvers—
Single Action ..... *95¢@$1.00*
Double Action, except 44 cal. *$2.00*
Double Action, 44 caliber ... *$2.00*
Automatic *$4.00*
Hammerless *$4.50*

Riddles, Hardware Grade
16 in. ..... *per doz.$2.50@$2.75*
17 in. ..... *per doz.$2.75@$3.00*
18 in. ..... *per doz.$3.00@$3.25*

Rings and Ringers—
Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.10	1.25	1.65 *doz.*

Hog Rings and Ringers—
Hill's Rings, gro. boxes, $4.60@ $4.75; per doz. boxes, 40@45¢.
Hill's Ringers, Gray Iron, doz., 55@65¢
Hill's Ringers, Malleable Iron, doz.85@95¢
Blair's Rings..per gro.$5.00@$5.50
Blair's Ringers...per doz.75@90¢

Rivets and Burrs—
Copper 50%
Carriage, Coopers', Tinners', &c.:
Black ..... 70&10%
Metallic Tinned 70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—
Cronk's Stay, No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60 ..... $0.75
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%

Rope—
Manila, 7-16 in. diam. and larger: Pure ..... *lb. 9¢*
Sisal, 7-16 in. diam. and larger: Pure ..... *lb. 7¢*
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Pure ..... *lb. 7½@7¾¢*
Sisal, Tarred, Medium Lath Yarn: Pure ..... *lb. 6½@6¾¢*
Cotton Rope:
Best, ¼-in. and larger.16½@18¢
Medium, ¼-in. and larger.15@16¢
Common, ¼-in. and larger..7½¢
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. and up, lb. ..... *5½¢*
Thread, No. 2, ¼-in. and up, lb. ..... *5¢*

Wire Rope—
Galvanized ..... *37½&2½%*
Plain ..... *45&2½%*

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules
Boxwood ..... *60@60&10%*
Ivory ..... *35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 50@50&10%
Stephens' Combination 35%
Stationers' ..... 50@50&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 55%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 18 in, wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16%%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws ..... 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds, 25%; The Best, 35%; Culley 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades, Hand Frames, Power Blades 40%

Scroll—
Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Leeter, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—
Union Platform, Plain ..... $2.10@2.20
Union Platform, Stpd ..... $2.20@2.30
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—
Box, 1 Handle ..... doz. $1.85@2.10
Box, 2 Handle ..... doz. $2.35@2.50
Ship ... Light, $2.00; Heavy, $1.50
Chapin-Stephens Co., Box ..... 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1¼, $3.00@3.25; 1¼ $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—
Lag, Cone Point ..... 80&5%
Coach, Gimlet Point 80%
Hand Rail ..... 70&10@75%

Jack Screws—
Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—
Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—
Set (Iron) ..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron ..... 87½&5@.. %
Round Head, Iron ..... 85&5@.. %
Flat Head, Brass ..... 80&5@.. %
Round Head, Brass .. 77½&5@.. %
Flat Head, Bronze .... 75&5@.. %
Round Head, Bronze .. 72½&5@.. %
Drive Screws ..... 87½&5@.. %

Scroll Saws—
See *Saws, Scroll.*

Scythes— *Per doz.*
Plain Grass, Cutting Edge Polished ..... $6.25@$6.50
Clipper, Bronzed Web .. $6.50@$6.75
Solid Steel, Web and Backs Polished ..... $7.00@$7.25
Bush, Weed and Bramble, Painted ..... $6.50@$6.75
Grain, Painted, Cutting Edge Polished ..... $8.25@$8.50
Clipper Grain, Bronze Web, $8.50@$8.75

Seeders, Raisin—
Enterprise ..... 25@30%

Sets— Awl and Tool—
Fray's Tool Handles, Nos. 1, $12; 2, $16; 3, $12 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 .. 20&10%

Garden Tool Sets—
American Fork & Hoe Co.:
Rake, Shovel and Hoe, ℔ doz. sets, No. 3 P F $7.25

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt. ..... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled, Cup Pt. ... ℔ gro. $7.50

Rivet—
Regular list ..... 75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut ..... ℔ doz. $7.50
Royal, Hand ..... ℔ doz. $4.50
Taintor Positive ..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50
} 50%

Skate—
Smith & Hemenway Co., Eureka .. 50%

Shaves, Spoke—
Iron ..... doz. $1.25
Wood ..... doz. $2.00
Bailey's (Stanley R. & L. Co.) 45%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%

Shears—
Cast Iron	7	8	9 in.
Best	*$16.00*	*18.00*	*20.00 gro.*
Good	*$13.00*	*15.00*	*17.00 gro.*
Cheap	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality Jap ..... 70&10&5%
Best Quality Nickel .. 60&10&5%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
National Cutlery Co.'s Nickel Plated, 60&10%; Japan Handles ..... 70&10%
Columbian Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—
Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 50&10%
Acme Cast Snips ..... 40@45&5%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
National Cutlery Co.'s Forged Steel 50%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%; W. R. W. 50%
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz, $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00 ..... 25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. ..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%

Sheaves—Sliding Door—
Reading 40%
R. & E. list 15%

Sliding Shutter—
Reading list 40%
R. & E. list 15%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 60&5%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme and Magic, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade ..... 25&5%
Union League, 10 and 12 gauge, Rival grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge 20%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade .. 20%

Shells, Loaded—
Loaded with Black Powder .. 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders .. 40&5%
Arrow, Smokeless Powders, 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.
Edwards Mfg. Co.:

	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in.	$4.05	$5.05
Dixie, 10 x 14 in.	4.25	5.45
Dixie, 7 x 10 in.	5.25	6.70

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—
25-lb. bag.
Drop, up to B $1.80
Drop, B and larger 2.05
Buck 2.05
Chilled 2.05
Dust 2.30

Shovels and Spades—
Association List, Nov. 15, 1902 .. 40%
Avery Stamping Co. 40%

Snow Shovels—
Long Handle ..... $2.50@$2.75
Wood and Mall, D Handle, $2.65@$2.90

Sieves and Sifters—
Hunter's Imitation, gro. $9.50
Hunter's Genuine, per gro. . $12.00

Sifters, Ash—
Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ℔ doz. $39.00

Sieves, Seamless Metallic
Per dozen.

Mesh	*1*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... doz. $0.90@0.95
Mesh 20, Nested .... doz. $1.00@1.05
Mesh 24, Nested .... doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 38 in. 60%
20 x 24 to 24 x 50 in. 50%
24 x 60 to 24 x 120 in. 30%
Barnes' low list 60%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... 70@75&10%
Steel ..... 40@45%

Slates, School—
Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&7 tens.
Victor A, Noiseless .60&5 tens d5%

Slaw Cutters—See *Cutters*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40
Jockey 25

Snaths—
Grass Scythe ..... 50&10@—%

Snips, Tinners—See *Shears*

Spoons and Forks—
Silver Plated—
Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co:
1847 Rogers Bros. ..... 40&10
Rogers & Bro., William Rogers Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous
German Silver ..... 60@60&5%

Tinned Iron—
Teas ..... per gro. 50@55¢
Tables ..... per gro. $0.90@$1.00
Atlas Mfg. Co.:
Tea Spoons, ℔ gro. ..... 50¢@55¢
Table Spoons, ℔ gro. ..... $0.90@$1.00

Springs— Door—
Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman Door and Gate 10%
Reliance (Coil) ..... 40&10%
Star (Coil) 35%
Torrey's Rod, 39 in. ..... ℔ doz. $1.00

Carriage, Wagon, &c.—
1¼ in. and Wider: Per 100 lb.
Black ..... $4.75@$5.00
Half Bright ..... $4.75@$5.00
Bright ..... $5.25@$5.50
Painted Seat Springs:
1½ x 2 x 26 ... per pair. 45@47¢
1½ x 3 x 28 ... per pair. 68@71¢

Sprinklers, Lawn—
American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ℔ doz. $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz, $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—
Nickel plated .. } List Jan. 5, 1900.
Steel and Iron . } 80&5@80&10%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60 & 10%; Iron Stock and Bevel 15%

Squeezers, Lemon
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.00
Iron, Porcelain Lined ... doz. $1.75
Victor, ℔ gro. $9.00

Staples—
Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Polished, $2.65; Galvanized $2.35
Poultry Netting Staples ..... per lb. 3¼@3½¢

Steels, Butchers'—
Dick's 30%
Foster Bros. 30%

Steelyards — .... 30@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock .. 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plate 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones, Axe—
Pike Mfg. Co., Axe Stones (all kinds) 33⅓%

Glass Cutters' Stones—
Pike Mfg. Co., Glass Cutters' Stones and Supplies 40%

Stones, Oil, &c.—
Pike Mfg. Co., 1907 list: ℔ lb
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $1.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 25¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢
India Oil Stones (entire list) .. 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 40%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks .. 40%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small .. ℔ lb 10¢
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢
} 33⅓%

Scythe Stones—

Pike Mfg. Co., 1907 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.50
Green Mountain S. S. ℔ gro. $7.00
Extra Indian Pond S. S. ℔ gro. $8.00
No. 1 Indian Pond S. S. ℔ gro. $7.50
No. 2 Indian Pond S. S. ℔ gro. $5.00
Leader Red End S. S. ℔ gro. $5.00
Quick Cut Emery ℔ gro. $10.00
Pure Corundum ℔ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat. $11.00
Emery Scythe Rifles, 4 Coat. $13.20
} 33⅓%
Balance of 1907 list 33⅓%.
Lectro (Artificial), ℔ gro., $12.00 $12.00 33⅓%
Lightning (Artificial), ℔ gro., $18.00 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers ℔ gro. $9.00

Stops—Bench—

Millers Falls 15&10%
Morrill's, ℔ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 50@50&10%

Plane—

Chapin-Stevens Co. 20%

Straps—Box—

Acme Embossed, case lots. 20&10&10%
Cary's Universal, case lots. 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points . . doz. 55¢
All Steel Socket . . . doz. $2.00@2.25
Excelsior Stretcher and Tack Hammer Combined, ℔ doz., $6.00 20%

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses 25@25&12½%
National Specialty Co., list Jan. 1, 1902 30&5%
P., S. & W. Co. 40&10&5%

Sweepers, Carpet—

NOTE.—Leading Manufacturers give the following rebates from list prices: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks. 90&25@—%
American Cut Tacks . . 90&25@—%
Swedes' Cut Tacks. . . 90&30@—%
Swedes' Upholsterers'. 90&35@—%
Gimp Tacks. 90&35@—%
Lace Tacks. 90&35@—%
Trimmers' Tacks . . . . . 90&30@—%
Looking Glass Tacks . . . . . 65@—%
Bill Posters' and Railroad Tacks, 90&10@—%
Hungarian Nails . . . . . 80@—%
Finishing Nails . . . . . 70@—%
Trunk and Clout Nails. 75&5@—%
NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks, 90&6 tens@—%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.:

Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin. . . . 50@—%
Patent Leather. . . . . 25@30&5%
Steel . . . . . 33⅓&5%
Chesterman's . . . . . 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin. 40&10@50%
Favorite, Duck and Leather. 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkins:
Asses' Skin. 40&10@50%
Metallic . . . . . 30@30&5%
Patent Bend, Leather. . . 25&5@25&10%
Pocket . . . . . 40@40&5%
Steel . . . . . 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lb. . . . . $2.55@$2.80

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c. . . . . 30@35%

Ties, Bale—Steel Wire—

Single Loop . . . . . 82½&10%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White. 20@20&5%

Haying—

Myers' Hay Tools. 50%

Ice Tools—

Gifford-Wood Co. 15%

Miniature—

Smith & Hemenway Co.'s, Davidson, ℔ doz., Nickel Plated, $1.50; Gold Plated. $2.00

Saw—

Atkins' Cross Cut Saw Tools. . . . 35&5%
Simond's Improved. 33⅓%
Simonds' Crescent. 30%

Ship—

L. & I. J. White. 25%

Torches—

Hammers, Engine, ℔ doz. $4.50

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz., $1.15@$1.25; gro. . . . $11.50@12.00
Harper, Champion or Paragon, doz., $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida . . . . . 75@10%
Newhouse . . . . . 50&5%
Hawley & Norton. 65&10%
Victor . . . . . 75@75&10%
Oneida Community Jump. 70&5%
Stop Thief. 60%
Tree Trap. 60%
Hector . . . . . 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine), ℔ doz.:

	Crate lots.	Small lots.
No. 1, Rat.	$11.50	$14.50
No. 3, Rat.	$5.75	$6.50
No. 3½, Rat.	$4.70	$5.25
No. 5, Mouse.	$2.25	$3.00

Animal Trap Co.:
Out o' Sight, Mouse, ℔ doz. $0.60
Out o' Sight, Rat, ℔ doz. 1.20
Easy Set, Mouse, ℔ doz. .35
Easy Set, Rat, ℔ doz. .85
Out o' Sight Chockers, ℔ doz. holes .12
Out o' Sight, Tin, 5-hole, ℔ doz. traps .75

Trowels—

Disston Brick and Pointing. 25%
Disston Plastering. 20%
Disston "Standard Brand" and Garden Trowels. 30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Forged Steel Garden Trowels, in bulk, net ℔ gro. $5.50
In 1 doz. boxes. ℔ gro. $6.00
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern. 50&10%
Western Pattern. 60&10%
Handy Trucks. ℔ doz. $16.00
Grocery . . . . . ℔ doz $15.00
McKinney Trucks. each, net $10.00
Model Stove Trucks. ℔ doz $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized.	$67	$79	$89	$99

10&7½ &5&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls . 21@23¢
No. 12, ¼ and ½-lb. Balls . 19@21¢
No. 18, ¼ and ½-lb. Balls . 16@18¢
No. 24, ¼ and ½ -lb. Balls . 15½@17½¢
No. 36, ¼ and ½-lb. Balls . 15@17¢
Chalk Line, Cotton ½-lb. Balls . . . . . 24@29¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. . . . . 8½@19¢
Cotton Wrapping, 5 Balls to lb., according to quality . . 13½@19¢
American 2-Ply Hemp, 1, and ½-lb. Balls. . . . . 12½@15¢
American 3-Ply Hemp, 1-lb Balls . . . . . 13½@16¢
India, 2-Ply Hemp, 1½-lb. Balls, Balls (Spring Twine) . . 7½@9¢
India 3-Ply Hemp, 1-lb. Balls 7½@9¢
India 2-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, 1½-lb. Balls . . . . . 9@11¢
Mason Line, Linen, ½-lb. Bls. 17¢
No. 264 Mattress, ¼ and ½ lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply . . . . B 6¢; A 7½¢

Vises—

Solid Box . . . . . 50&5@50&10&5%

Parallel—

Athol Machine Co.:
Simpson's Adjustable. 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co., Slide 40&5% 65%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.
Fulton Mach. & Vise Co.:
F. & R. Double Swivel Machinists' 40%
Star, Solid Jaw, Machinists' 40%
Hollands':
Machinists' . . . . . 40@40&5%
Keystone . . . . . 65&5@70%
Lewis Tool Co.:
Adjustable Jaw. 30%
Monarch, 50%; Solid Jaw. 50%
Massey Vise Co.:
Clincher 40%
Parallel Bar. 15%
Perfect, 15%; Lightning Grip. 15%
Merrill's 25%
Millers Falls Oval Slide Pattern. 60&10%
Parker's:
Victor, 20@25%; Regulars. 20@25%
Vulcan's . . . . . 40@45%
Combination Pipe. 55@60%
Prentiss . . . . . 20@25%
Rock Island. 25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps. 30%
Perfection Saw Clamps, ℔ doz. $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
F. & R. Double Swivel Coachman's 40%
Star Solid Jaw Woodworkers' 60%
Massey Vise Co.:
Lightning Grip, 15%; Perfect. 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Fulton Machine & Vise Co., Combination Pipe. 70%
Holland's Combination Pipe. 60@60&5%
Massey's Quick Action Pipe. 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Rock Island Pipe. 25%

Wads—*Price per M.*

B. E., 11 up . . . . . 60¢
B. E., 9 and 10 . . . . . 70¢
B. E., 8 . . . . . 80¢
B. E., 7 . . . . . 80¢
P. E., 11 up $1.00
P. E., 9 and 10 . . . . . 1.25
P. E., 8 . . . . . 1.50
P. E., 7 . . . . . 1.50
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20 . . . . $3.00@3.25
Dis. 15%

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled . . . . . 45&10%
Ground . . . . . 50&5%
Plain or Unground 60%
Country Hollow Ware, per 100 lbs . . . . . $2.75@$3.00
White Enameled Ware:
Maslin Kettles. . . . . 65&10%
Covered Wares:
Tinned and Turned . . . . 35&10%
Enameled . . . . . 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware. 33⅓%
El-an-ge . . . . . 60&10%
Iron Clad Ware. 70&10%
Lava and Volcanic, Enameled. 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles . . . . . 65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd. 60%
Steel Stew Pans, Stew Pots, etc., Porcelained 50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles . . . . . 65&5%
Solid Steel Kettles. 60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone. 40@40&10%

Washboards—

No. ℔ doz.
800—Brass King, Single Surface, Open Back. $2.80
862—White Hen, Spiral Grimp Glass $3.35
964—Royal Blue Enamel, Single Surface, Ventilated Back. $3.35
172—Our Best, Single Zinc, Soap Drainer $3.35
722—Soap Saver, Single Zinc, Iron Top $3.35
100—Northern Queen, Single Zinc, Perforated, Open Back. $3.00
134—Universal, Single Zinc, Extra Family Size, Ventilated Back. $2.80
760—Banner Globe, Single Zinc, Ventilated Back. $2.25
57—Peerless, Double Zinc, Spring Protector $3.70
56—Red Cross, Double Zinc, Swing Protector $3.60
17—North Star, Solid Zinc, Swing Protector $3.60
797—Jewel, Single Zinc, Pail Size. $1.25

Washers—Leather, Axle—

Solid . . . . . 90@90&10%
Patent . . . . . 90@90&5%
Coil: ⅞ 9¢ 1 10¢ 1⅛ 11¢ 1¼ inch. 14¢ per box.

Iron or Steel—

Size bolt. . . . 5-16 ⅜ ½ ⅝ ¾
Washers $4.90 4.00 2.70 2.50 2.30
The above prices are based on $6.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ℔ 100 lb. discount: in 100 lb kegs add 10¢ net ℔ 100 lb; in 5 or 10 lb boxes, add 50¢ net ℔ 100 lb; in 1 lb boxes, add $1.00 net ℔ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wedges—

Oil Finish . . . . . lb., 2¼@2¾¢

Weights—Hitching—

Covert Mfg. Co. 30&2%

Sash—

Per net ton, f.o.b. factory:
Eastern District. . . . . $20.00@—
Western and Central Districts . . . . . $20.00@—

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery 75%

Well—

8-in., $2.00; 10-in., $2.30; 12-in., $3.00; 14-in., $4.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 . . . . . 72&10&7½%
10 to 18 . . . . . 72½&10&10%
19 to 26 . . . . . 75&10&10&2½%
27 to 36 . . . . . 77½&7½%
Galvanized:
6 to 9 . . . . . 72½&10%
10 to 14 . . . . . 72½&10&5%
15 to 16 . . . . . 72½&10&5%
17 to 18 . . . . . 72½%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 65&10&10%
Coppered:
6 to 9 . . . . . 65&10&10%
10 to 14 . . . . . 70&10&5%
15 to 18 . . . . . 65&10&10&10%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 72½&10&2½%
Tinned:
6 to 18 . . . . . 67&10&10%
Brass . . . . . 16¼¢ lb., base
Copper . . . . . 15½¢ lb., base
Cast Steel Wire 50%

Spooled Wire—

Annealed and Tinned. 75@75&10%
Brass and Copper . . . . 70@70&10%
Retailers' Assortments, per box. $1.90@$2.10
Wire Clothes Line, See Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods . . . . . 90&10%
Brass Wire Goods, 90&10&90&10&10%
Brass Cup and Shoulder Hooks, 85&10%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&10@80&10&5%
Screen Cloth, 12 Mesh, Per 100 sq. ft.: Painted, $1.30; Galvanized, $1.90; 14 Mesh, Bronze $6.50
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh $2.75
Nos. 4 and 5 Mesh $3.00
No. 6 Mesh $3.25
Nos. 7 and 8 Mesh $3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural . . . . . 80&5@80&10%
Alligator or Crocodile. . 70&10@75%
Baxter Pattern S Wrenches, 70&5@70&10%
Drop Forged S . . . . . 45@45&5%
Acme . . . . . 60&10%
Alligator Pattern, 70%; Bull Dog. 70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut. 50&5%
Combination Black. 50&5%
Merrick Pattern. 50&5%
Boardman's 40%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model. 40&10&5&5%
Coes' Genuine Hammer Handle. 40&10&5&5%
Coes' "Mechanics'". 40&10&10&5&5%
Donohue's Engineer. 40&10%
Eagle 70%
Gem Pocket. 30%
Hercules 70%
W. & B. Machinist:
Case lots. 50&10%
Less than case lots. 50%
W. & B. Railroad Special:
Case lots. 50%
Less than case lots. 40&10&5%
Solid Handles, P., S. & W. 50&10%; full cases. 50&10&5%
Standard Nipple Mfg. Co.:
Duplex Chain. 50%
Uwanta Wrench Co.:
Uwanta Special, Iron Handle. 40&10&5%
Other Wrenches. 50%
Vulcan and Agrippa Chain. 50%
Whitaker Machinists'. 50&10%
Wizard Adjustable Ratchet. 50%

Fruit Jar—

Beni, P. Forbes, Triumph, ℔ gro., $7.50; per doz. $0.90

Wrought Goods—

Staples, Hooks, &c., list March 17, '02 . . . . . 90@—%

Zinc—*(Cask lots at mill.)*

Sheet . . . . . per 100 lb., $7.00

For the Table of "Current Metal Prices" see the First Issue of Every Month.

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅞ in. round and square; 1½ to 4 in. x ⅜ to 1 in.	₩ ℔ 1.80¢
1½ to 4 in. x ¼ to 5-16.	₩ ℔ 2.00¢
Rods—⅜ and 11-16 round and square	₩ ℔ 2.00¢

Angles:	Cts ₩ ℔
3 in. x ¼ in. and larger	2.25¢
3 in. x 5-16 in. and ⅛ in.	2.30¢
1½ to 2½ in. x ⅛ in.	2.10¢
1½ to 2¾ in. x 3-16 in. and thicker	2.05¢
1 to 1¼ in. x 3-16 in.	2.10¢
1 to 1¼ x ⅛ in.	2.15¢
⅞ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ⅛ in.	3.45¢
½ x 3-32 in.	3.55¢

Tees:	
1 in	2.45¢
1¼ in.	2.20¢
1½ to 2½ in.	2.10¢
3 in. and larger	2.35¢
Beams	2.25¢
Channels, 3 in. and larger	2.25¢
Bands—1½ to 6 x 3-16 to No. 8	2.25¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.30¢

Merchant Steel from Store—

	per ℔
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ ℔ 2.60	3.00¢
Nos. 18 to 21	₩ ℔ 2.95	3.10¢
Nos. 22 and 24	₩ 3 00	3 4.¢
No. 26	₩ ℔ 3.15	3.45¢
No. 28	₩ ℔ 3.20	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, W. Deweeswood ₩ ℔ 11¾@14¼
Patent Planished ₩ ℔ A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16	₩ ℔ 3.15¢
Nos. 22 to 24	₩ ℔ 3.55¢
No. 26	₩ ℔ 3.75¢
No. 28	₩ ℔ 4.25¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—Galvanized.

Nos. 22 and 24	₩ ℔ .5 75¢
No. 26	₩ ℔ .6.25¢
No. 28	₩ ℔ .7 25¢

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.40
IX, 14 x 20	7.65
A. Charcoal:	
IC, 14 x 20	$5.45
IX, 14 x 20	6.55

American Coke Plates—Bessemer-

IC, 14 x 20	107 ℔	$4.45
IX, 14 x 20		5.45

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 60
IX, 20 x 28 with an 8 lb. coating	10.60

Seamless Brass Tubes—

List December 4, 1905. Base price 19¢

Brass Tubes, Iron Pipe Sizes—

List December 4, 1905. Base price 19¢

Copper Tubes—

List December 4, 1905. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 22½¢ ₩ ℔

High Brass Rods—

List August 1, 1908. 16¼¢ ₩ ℔

Roll and Sheet Brass—

List August 1, 1908. 16¢ ₩ ℔

METALS—

Tin—

Straits Pig ₩ ℔ 33 @33¼¢

Copper—

Lake Ingot	₩ ℔ 14¾@15 ¢
Electrolytic	₩ ℔ 14½@14¾¢
Casting	₩ ℔ 14¼@14½¢
Sheet Copper Hot Rolled, 16 oz.	₩ ℔ 18 ..¢
" " " 14 "	" " 19 ..¢

Sheet Copper Cold Rolled, 1¢ ₩ ℔ advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.
Bottoms, Pits and Flats ₩ ℔ 21¢ basis
Planished Copper, 1¢ ₩ ℔ more than Polished.

Spelter—

Western ₩ ℔ 5¾@6¢

Zinc.

No 9, base, casks, ₩ ℔ 7.50¢ | Open ₩ ℔ 8.00¢

Lead.

American Pig ₩ ℔ 5 @5¼¢
Bar ₩ ℔ 6 @6¼¢

Solder.

½ & ½, guaranteed ₩ ℔ 21 @21¼¢
No. 1 ₩ ℔ 18¼@18½¢
Refined ₩ ℔ 16 @16¼¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson ₩ ℔ .@10¢
Halletts .@9¼¢
Other Brands .@9 ¢

Bismuth—

Per. ℔ $1.90@$2.00

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:
Small lots .74¢
Rods & Wire Base Price 33¢
Sheets Base Price 34¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	—Cents—
Copper, Heavy and Wire	₩ ℔ 10.75@11.00¢
Copper, Light and Bottoms	₩ ℔ 10.00@10.50¢
Brass, Heavy	₩ ℔ 7.75@ 8.00¢
Heavy Machine Composition	₩ ℔ 10 25@10.50¢
Clean Brass Turnings	₩ ℔ 7.50@ 7.75¢
Composition Turnings	₩ ℔ 8.00@ 8.25¢
Lead, Heavy	₩ ℔ ....@ 3.50¢
Tea Lead	₩ ℔ ....@ 3.25¢
Zinc Scrap	₩ ℔ ....@ 3.00¢

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

ISSUED EVERY THURSDAY MORNING.

Subscription, postpaid, $5 00 a year.

TWO DOLLAR EDITION, $2.00 a year; DOLLAR EDITION, $1.00 a year, to the United States, Mexico, Hawaii Cuba, Philippine Islands. OTHER COUNTRIES: Weekly Edition $7.50; Semi-monthly Edition, $4.00; Monthly Edition, $2.50.

ADVERTISING RATES ON APPLICATION.

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ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND CLASS MATTER